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MELANOBLASTOMA OF THE LACRIMAL CARUNCLE

REPORT OF A CASE AND REVIEW OF THE LITERATURE

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The lacrimal caruncle, although located at the point where the ocular and palpebral conjunctivae merge at the inner angle of the eye, is not itself of conjunctival structure, but derives from the ciliary margin of the eyelid and is continuous in structure with this margin. As a body of modified skin, it possesses an outer layer of epithelium and a connective-tissue stroma containing the structures ordinarily present in the derma. The surface epithelium is of the stratified squamous variety except where the caruncle slopes toward the eyeball, where the epithelium alters gradually to admit the cylindrical cells that are seen in the conjunctiva of the globe. The connective tissue is rather dense, contains many elastic fibers, and is traversed by large numbers of blood vessels and by nerves, smooth muscle fibers, and a few striated fibers having their origin in the orbicular muscle of the eye (Aliquò-Mazzei[1]). Hair follicles with rudimentary hairs, sebaceous glands, sweat glands, and a few acinous mucous glands are present.

According to Roselli[2] the size of the caruncle varies, depending on the conformation of the orbit and the position of the eye in the orbit. Under the same conditions of size of orbit, of lid aperture, and of prominence of the eyeball, it is larger in women than in men, and larger and paler in older persons than in young persons. In infants the caruncle is very small, and he thinks that the absence of tears in early infancy can be attributed to this fact. He states that the function of the caruncle is to elevate the internal angle of the lids, so that a lake may be formed for the collection of the tears.

Vagliasindi del Castello[3] agrees that the form and position of the caruncle are intimately concerned in the physiologic course of the tears, but holds that the so-called lacrimal lake is normally dry in its greater extent, since, according to his researches, the tears run in a canal carried on the surface of the semilunar fold. It is the caruncle that forms the internal bank of this canal and keeps the tears from overflowing by way of the internal angle of the eye.

Compared with the other organs of the visual apparatus, the caruncle shows a remarkable relative immunity to disease. This is more surprising when one considers its exposed position, its contiguity to the conjunctivae, which are so often inflamed, and the fact that it is continuously bathed in fluids that are at times pathologic. No satisfactory explanation has been offered for this relative immunity, which applies to neoplastic as well as to inflammatory disease. In 60,000 eye patients Wätzold[4] saw not more than six tumors of the caruncle, and of these, three were congenital. In 15,000 patients Vail[5] saw only one such tumor.

From time to time, an observer of a

case, noting the rarity of tumors of this organ, has attempted to collect from the literature all cases published. One of the latest and best of these collections is that of Serra[6] (1928). He enumerates 136 tumors of the caruncle, including simple hypertrophy and cysts. The Italians, to judge from the number of their publications, have displayed a particular interest in this subject over a long period of years.

It is clear from the histologic structure of the lacrimal caruncle that neoplasms arising in it may be of epithelial or of connective-tissue origin or of mixed nature. Furthermore, the vascular, glandular, and other elements situated within the connective-tissue stroma may proliferate and give rise to neoplasms showing their peculiar features. The small total of published cases does, in fact, include benign and malignant neoplasms of the widest variety.

The precise nature and origin of melanotic tumors of the caruncle have been much discussed. A large proportion of such tumors have arisen directly out of pigmented nevi, but the nevus is a complex body, and the origin of the characteristic cell of the nevus has not yet been determined with certainty. Some investigators who have made detailed histologic studies in individual cases of pigmented nevus of the caruncle have thought that their findings pointed to the epithelial nature of the nevus cell (Aliquò-Mazzei[1]) while others, as a result of similar investigations in other cases, hold to the theory of connective-tissue origin (Stoewer[7]). Ribbert believes that the nevus cell is a special cell that is normally present in the connective tissue of the various organs (Aliquò-Mazzei[1]).

The origin of the nevus cell is of practical interest for the better understanding of the nature of malignant neoplasms developing from nevi. Tirelli[8] lists four theories of origin of the nevus cell: (1) that it derives from the basal cell of the epithelium, detached and forced downward into the connective tissue in consequence of the malformation that gave rise to the nevus; (2) that it derives from the aforementioned cell but that the latter, subsequent to its displacement, becomes transformed into a connective-tissue cell; (3) that it is a young connective-tissue cell or an endothelial or perithelial cell originating from the endothelium or perithelium of the blood or lymph vessels; (4) that it is genetically identical with the chromatophore.

To the advocates of the epithelial origin of the nevus cell, malignant tumors developing from nevi are melanocarcinomas. To the advocates of the connective-tissue origin, they are melanosarcomas; while for those investigators who fail to find convincing proof for either the epithelial or the connective-tissue genetic theory, these tumors constitute a group by itself, characterized by multiplication of one sole species of cell, the chromatophore, and appropriately to be termed chromatophoroma. Tirelli himself, holding that both epithelial and connective-tissue cells have pigmentary function, which may behave pathologically in the course of neoplastic evolution, concludes that the determining factor in the transformation of nevus into malignant melanotic tumor is the type of neoplasia, and that the type depends on which species of cell in the complex nevus structure reacts to the proliferative impulse. Carl V. Weller, of the University of Michigan, stated in a personal communication to me that the melanin in the lower layers of the epidermis is contained in processes of chromatophores and is not within the epithelial cells themselves.

In the past, the majority of melanotic tumors of the caruncle, whether or not they have developed in a nevus, have been described as melanotic sarcomas or melanosarcomas; but in a few cases the examining pathologist has insisted on the

epithelial nature of the tumor and it has been published as melanotic epithelioma, melanotic cancer, and so on. More recently the term melanoblastoma has come into general use for all of the melanin-producing tumors, especially the malignant tumors. The term melanoma is similarly used. Thus, a troublesome question is, for the time being at any rate, transferred from the records of clinical cases to the research laboratory.

There is a difference of opinion as to whether the nevus itself should be considered as a benign neoplasm or as a malformation. Pigmented nevi will not be included among the melanotic tumors included in this paper, but for completeness' sake reference is made to Aliquò-Mazzei's[1] listing of 11 nevi of the caruncle, two of which were not pigmented, and to his description of his own case, which was thought, on grounds of its clinical course, to be malignant until histologic examination failed to show any malignant characters. Cosmettatos[9] has described a case of malanosis occupying almost the entire caruncle. Melanosis differs from nevus in being more or less diffuse rather than circumscribed. He has seen two types of melanosis of the caruncle—one with pigmented cells and one with pigment in small grains scattered between the epithelial cells.

Serra's[6] collection of tumors of the caruncle included 13 pigmented tumors. From an extensive search of the literature I am able to add 16 to Serra's 13. With the case which I am reporting this makes a total of 30 cases of pigmented tumor of the caruncle reported to date, according to my findings. With the exception of those of Seitz, Rydel, and Azzena, all of the descriptions in literature were examined in the original publication. Since the greater number of these reports appeared in medical journals that are relatively difficult of access, or in theses, I have thought it worth while to give here a résumé of each of the 29 cases in the literature, so that, by focusing all available light on the subject at one time, it may be illuminated so far as is possible at present.

This list does not include pigmented tumors originating in the semilunar fold, except when, as in one or two cases, it may have been impossible to ascertain with certainty whether the tumor took its start from the caruncle or from the fold. A number of cases of melanotic tumor of the semilunar fold have been reported, among which may be mentioned those of Meighan,[10] Rumschewitsch,[11] Pflüger,[12] and others, and Greear's case mentioned by Allen in the discussion of Vail's[5] paper.

My list includes two cases of benign melanotic tumor: A lymphogranuloma, reported by Busacca,[13] and a fibrolipoma, reported by Menacho.[14] Busacca states that the pigment in his case was intracellular as well as extracellular. In Menacho's case "grains of the appearance of melanin" were present, and it may be assumed that they were extracellular—deposited from without and not produced by tumor cells. This case would not, therefore, come under the term melanoblastoma, but is included under the head of pigmented tumor, which says nothing as to the source of the pigment. Ludwig[15] and Emmanuel[16] consider the tumor in their case, which occurred as a late development in neurofibromatosis, to have been of the nature of neuroma, but since, seemingly, they take the position that the usual pigmented "sarcoma" of the caruncle and of the conjunctiva is also of this nature, their case is included here without more ado.

Cases of pigmented tumor of the caruncle

1. Seitz[17] (1855). A male, aged 51 years. Duration, one year. Onset noticed as a small blackish-red spot. Growth was rapid during the last six months. Size at-

tained, that of a small bean. No pain. On examination: blue-black in color, lobulated, adherent to sclera and to upper lid. Extirpated "completely," but recurred three times in eight months. First recurrence, in upper lid; second, between upper lid and eyeball; third, same. Eyeball was not affected. Patient lost track of, after fourth operation. Histologic diagnosis: melanocarcinoma.

2. Gillette[18] (1873). A male, aged 31 years, a railway watchman, had been in the habit of introducing small quantities of tobacco and of his own urine into his eye to overcome drowsiness during the night. Duration, five years. Onset, first noticed as very small tumor. Right eye. Growth rapid. Size attained, that of lentil. No pain, but the presence of the tumor interfered with free movement of the eyelids. The tumor was removed by operation six times in the space of a few months. Each of the five recurrences was at the original site. The tumor invaded the orbital region, destroying the periosteum and extending to the bone, but the eye was not affected, at least in the deep portions. There were no constitutional disturbances. Diagnosis: melanotic sarcoma.

3. Rydel[19] (1875). A female, aged 40 years. The patient presented a recurrence of a tumor of the right caruncle. Size attained, that of a pea. Invasion of adjacent ocular conjunctiva. Diagnosis: melanosarcoma. According to a later report, the tumor recurred again at the same site one year after removal.

4. Péau[20] (1877). A male, aged 32 years. In 1871 a fragment of burning coal struck the inner angle of the eye, inflicting a burn which was followed by conjunctivitis. The conjunctivitis was treated and cured. Four years later the patient was troubled by itching of the caruncle and a tumor appeared on the caruncle. Two years from the onset the tumor was removed with the inner half of the lower segment of the ocular conjunctiva. After three months, recurrence in the middle of the upper lid. Color violaceous to black. Submaxillary gland involved. Histologic diagnosis for both primary and recurrent tumors: melanotic sarcoma.

5. Despagnet[21] (1888). A female, aged 20 years. Duration, 18 months. Onset, as black spot, thought to be a foreign body. Size attained, that of a small pea. On examination: rounded, smooth, completely black, short pedicle, which was dark red. No glandular involvement. Operation: pedicle snipped at base and a certain amount of healthy tissue at site of implantation excised. Histologic examination showed that the tumor had developed at the expense of three kinds of epithelium: (1) that of the caruncle, (2) that of the sebaceous glands, (3) that of the hair follicles. Pigment extended deep. Histologic diagnosis: melanotic epithelioma.

6. Silex[22] (1889). A male, aged 60 years. In 1884 an extensive tumor, diagnosed melanosarcoma, and involving the caruncle and conjunctiva of the left eye, was removed, with excision of all affected parts. One year later the tumor recurred. Recurrence occupied the greater part of the lower half of the conjunctiva and extended to the caruncle. It was excised. Histologic diagnosis: melanosarcoma. Death in 1886 of intercurrent affection. No ground for suspecting metastasis.

7. Sgrosso[23] (1889). A male, aged 70 years. Duration three years. Growth slow. Size attained, that of a pea. No symptoms. On examination: oval shape, hard. Microscopic sections showed mixed cells, with pigment grains in protoplasm and nucleus; blood vessels and lymph vessels, many of which were filled with pigmented epithelial cells. The endothelial lining of the vessels took part in the formation of the melanotic tumor. Histologic diagno-

sis: melanotic cancer.

8. Veasey[24] (1897). A male, aged 26 years. Duration, seven weeks. Onset, as pinhead-sized nodule. Right eye. Growth rapid. Size attained, that of a small green pea. Moderate lacrimation. On examination: pedunculated; slightly ulcerated; pedicle and base redder than remainder of caruncle. Operation: tumor dissected out and point of attachment cauterized. No recurrence in one year. Microscopic description states that there was "very little pigment in any of the sections, but all of them showed muscle fibers divided transversely and longitudinally." Histologic diagnosis: round-cell sarcoma.

9. Snell[25] (1897). A female, aged 62 years. Duration, nine months. Onset, as black pimple. Right eye. Growth, gradual; later, more rapid. Pain not severe. General health not affected. On examination: dark sepia in color, apparently springing from caruncle and semilunar fold, occupying one half of palpebral fissure, protruding between lids. Outer edge well defined and overlying half of cornea. Bled readily on touch. Movement of eyeball free. Vision good when eye was turned away from tumor. Operation: tenaculum passed through growth, tumor drawn forward and carefully dissected out. Found to extend between inner margin of orbit and eyeball. Removed entire portion of upper lid, to which tumor was adherent, also excised. Recurrence within a few months, which at the end of one year from operation was larger than the growth removed. Death shortly thereafter; no further particulars obtained. Microscopic findings: pigmented spindle and round cells, latter predominating; also free pigment. Histologic diagnosis: melanotic sarcoma.

10. Berl[26] (1901). A male, aged 72 years. Duration, one year. Left eye. Size attained, 2.5 cm. by 2 cm. On examination, a brownish-black body was seen protruding from the inner angle of the eye. It occupied the region of the caruncle and the inner half of the ocular conjunctiva and extended over both lids and into the fornices. The preauricular and submaxillary glands were enlarged. The tumor consisted of polygonal cells rich in pigment in fine grains.

11. Blum[27] (1902). Duration one year, but more conspicuous during last few months. Right eye. Size attained, 3.5 mm. long by 3 mm. wide by 3.5 mm. high. Patient complained of sense of pressure and of headaches. On examination: a pigmented tumor attached to caruncle by short, broad pedicle. No ulceration. The patient had brown iris and dark hair. Microscopic examination showed mixed cells. In anterior portion, cells large and pigmented, in deeper portion, nonpigmented. Islands of epithelial tissue were present in the tumor tissue. Histologic diagnosis: melanosarcoma.

12. DeBerardinis[28] (1902). A male, age unknown. From age of five or six a black dot had been noticed on caruncle. Five months before examination this dot had begun to enlarge. Growth steady and gradual. Size attained, that of a small pea. On examination: rounded black elevation on site of caruncle, which had entirely disappeared. Semilunar fold and conjunctiva normal except for small black dot on tarsal conjunctiva near lacrimal point. Preauricular and submaxillary glands not enlarged. Specific plastic iritis. Operation: tumor removed and site cauterized. No recurrence to date —a matter of a few weeks. Microscopic sections showed many round cells, rich in pigment, and a smaller number of fusiform cells. A few sebaceous glands and hair bulbs were present deep in the tumor mass. Histologic diagnosis: melanosarcoma.

13. Ludwig[15] (1902) and Emmanuel[16] (1908). Male, aged 30 years (at the time

of the first operation on the eye). The patient presented a tedious history of recurrent hard fibromas of the right thigh and leg, adherent to muscle, fascia, or periosteum; spindle-cell sarcoma of the thigh, and thickening of the entire leg. Numerous nevi, of varying degrees of pigmentation, were scattered over the face, arms, and trunk. About 12 years after the first appearance of phenomena of neurofibromatosis, a prominent, blackish tumor developed on the caruncle of the right eye. Size attained, 9 mm. to 11 mm. in diameter. Two or three years from its onset the tumor was removed. It was surrounded by a thin capsule. The remains of the pigment in the conjunctiva spread diffusely to the skin flap used in plastic repair of the defect in the cornea and transition fold, and pigment developed on the ocular conjunctiva. One year later there was a recurrence in the lower lid and orbital tissues, and the orbit was emptied and the lid excised. Melanotic tumor masses were found in the neighboring sinuses. Death occurred six months later. No necropsy. Microscopic examination of the primary tumor of the caruncle showed in the deeper portion pigmented spindle cells; in the middle portion, cells displaying more of an epithelial character; and in the upper portion, large, round, nonpigmented cells. Sections of small nerve branches were seen on many of the slides. On other slides small nerve fibers were seen close to the masses of melanotic cells. The earlier history of the case up through the first operation on the eye is related by Ludwig, the later history by Emmanuel. Both authors discuss the relations of pigmented tumors of the caruncle or cornea to elephantiasis neuromatosa or neurofibromatosis and lay emphasis on the finding of nerve fibers in their tumor. Ludwig quotes Vennemann's assertion that melanotic tumor of the conjunctiva is, in its nature, intraepithelial peripheral neuroma.

14. Grilli[29] (1903). A female, aged 66 years. This is a case of recurrent tumor. The original tumor appeared at the inner angle of the left eye in 1900. It was bluish in color. It recurred a few months after removal. On examination, both fornices were now occupied by pigmented masses, showing interspersed patches of white and pink, and a large rounded mass occupied the region of the caruncle. Operation showed that this mass extended into the orbit to the bone, which, however, was not involved. Histologic diagnosis: fusocellular pigmented sarcoma.

15. Bock[30] (1905). A male, aged 24 years. Duration, a few months. Onset, as a brown spot. Growth, progressive. On examination, the caruncle was dark red and moderately enlarged, so that it protruded. On the free apex was a grayish-brown body, the size of a millet seed, and described as resembling an insect's wing. The patient was in apparent good health and physical examination was otherwise negative. Operation: the caruncle was pulled forward with a tenaculum and was removed with scissors. Microscopic findings: The upper part of the caruncle showed melanotic round-cell sarcoma. The entire caruncle was permeated with the same cells. The sebaceous and sweat glands in the vicinity of the tumor were much enlarged.

16. Menacho[14] (1907). An infant, aged four months. Nonpurulent conjunctivitis in the first days of life, which cleared up under home remedies. When the baby was a few weeks old, the caruncle was noticed to be enlarged and of a dark color. At four months of age, it was 4 mm. wide and 4 mm. high. The color was violaceous. Microscopic examination showed "fibrolipomatous nature and grains of the appearance of melanin."

17. Aurand[31] (1908). A female, aged

32 years. Duration, three months. Onset, as a small black spot. Left eye. Growth, slow. Size attained, 2-mm. to 3-mm. diameter. On examination, no pigmented spots were seen on the conjunctiva; there were two small nevi, only slightly pigmented, on the left cheek. The patient stated that there were no pigmented spots elsewhere on the body and that her health had always been good. Seven months previously, a sebaceous tumor had been removed from the nape of the neck and recently a chalazion from the upper lid of the right eye. The patient's mother died of cancer of the uterus at the age of 51 years. Operation: caruncle removed entire by means of scissors. Wound healed easily. Thereafter, the patient was lost sight of. Microscopic examination showed pigmented cells as far up as the middle layers of the epithelium, where many cells had undergone vacuolar degeneration. Histologic diagnosis: melanotic malpighian epithelioma, which, Aurand points out, "still passes under the name melanotic alveolar sarcoma because of its tendency to divide into lobules, nests or plaques."

18. Wolfrum[32] (1909). A female, aged 63 years. Tumor of left caruncle, partially nodular, pigmented in places. Caruncle excised. Microscopic findings: Entire caruncle extraordinarily poor in glands. Except for hair shafts, which were partially degenerated, and the cell masses of the nevus, there were no regularly constructed formations present. There were a few mitoses in the tumor cells, which are never found in the usual picture of nevus. In a few places the nevus masses were on the point of breaking into the vessels. Beginning malignancy was apparent. Histologic diagnosis: pigmented nevus with beginning malignancy.

19. Bergmeister[33] (1912). A male, aged 29 years. Six weeks before examination, the patient, a builder's laborer, injured the left eye by hitting against a projecting beam. Two weeks later hemorrhage occurred from the eye. On examination, the left eye presented a tumor, the size of a cherry, seated with a broad base on the inner half of the tarsal conjunctiva and including the semilunar fold and caruncle; grayish red, soft, smooth except for an ulcerated area where it came in contact with the lid. The nasal commissure was grayish black. The temporal half of the tarsal conjunctiva of the lower lid showed several polypoid, blackish tumors on a grayish-black conjunctiva. A deep black, small, oval nevus extended over the intermarginal seam. The right eye showed a pigmented nevus on the limbus, the iris was dark brown and presented a few typical nevi. Clinical diagnosis: melanosis with multiple sarcoma. Histologic diagnosis: melanocarcinoma or melanoblastoma. Serra comments regarding this tumor that it presented structural characters recorded in sarcoma, endothelioma, and pigmented sarcoma. He is of the opinion that it probably originated in the caruncle and spread to the conjunctiva of the tarsus.

20. Stoewer[7] (1912). A female, aged 25 years. Duration, nearly five years. Onset, as enlargement and bluish-gray discoloration of the caruncle. Growth, stationary at first; later, grew slowly. Size attained, 6 mm. by 4 mm. On examination: firm, smooth, bluish black. Operation: extirpation as deep as possible around the root of the caruncle. No recurrence in year. Microscopic findings: pigmentation more intense in deep parts than toward surface. Two characteristics of nevus are present: (1) downward displacement of epithelial cells, (2) subepithelial nevus cells. Peculiar pigmented cells with processes are present, which Stoewer suggests are the chromatophores from which Bergmeister derived the

nevus cell. Many mitoses are seen in the nevus cells. Histologic diagnosis: malignant nevus.

21. Rocher[34] (1914). A female, aged 18 years. Duration, "for some time." Onset, as small black nodule. No ocular trauma in history. Father died of carcinoma of stomach. On examination, the caruncle was normal in size but absolutely black, suggesting a mulberry. Symptomless. No glandular enlargement. Operation: removal of caruncle and semilunar fold (although the infiltration appeared limited to the caruncle). Histologic diagnosis: melanosarcoma of caruncle and semilunar fold. No recurrence in seven years, but general health poor. Rocher urges early operation, to include removal of semilunar fold.

22. Birch - Hirschfeld[35] (1920). A male, aged 45 years. Duration, six months. Onset, as a dark red spot. First seen by Birch-Hirschfeld on second recurrence. The patient was in military service and first consulted an army surgeon because the eye had become painful. The surgeon pronounced the spot a "trifle" and curetted it out with a sharp curette. It recurred after eight days and grew to the size of a bean. It was again removed and again recurred in eight days. The patient was now sent to the Clinic. On examination scattered tumor foci, some dark brown and some not pigmented, were found on various sites on the palpebral and ocular conjunctivae. The tarsus was infiltrated. No direct connection was apparent between the conjunctival tumors and the scars (nonpigmented) which marked the sites of the brown nodules removed from the caruncle. The preauricular gland was slightly enlarged, but was not tender. A clinical diagnosis of chromatophoroma was made, and the orbit was emptied. Scattered tumor foci, pigmented and nonpigmented, were found in the retrocellular tissue, in the sclera, and in the dural sheath of the optic nerve. There had been no symptom of orbital tumor. The orbital operation was undertaken because of the experience in the case reported by Ludwig and Emmanuel (No. 13 of this series). The diseased gland was excised. Six months later there was evidence of tumor of the liver and numerous metastases appeared in the skin. Death nine months after the orbital operation. No autopsy. Birch-Hirschfeld was not able to persuade himself that the cells of the nerve sheaths played any significant role in his case. He suggests an undiscovered pigmented tumor somewhere within the body as a possible primary source of the series of tumors in this case.

23. Azzena[36] (1923). A female, aged seven years. A nevus had been present on the caruncle of the left eye since birth. For several months it had been growing and causing pain. On examination, there was found seated on the nevus a rounded, sessile tumor, the size of a small chickpea, that protruded from between the lids when these were closed. The tumor was smooth, elastic, and rosy in color except for a spot of brown the size of a millet seed. The semilunar fold appeared normal. There were no palpable glands. Removal. No recurrence nor metastasis. The microscopic sections showed various pigmented areas. The pigment was observed free in fine grains and in clumps within the cells. Oval and fusiform cells with short, slender processes were seen. Histologic diagnosis: pigmented sarcoma. It was thought to have originated from the nevus and from the lymphendothelium.

24. Dorsey and Gillett[37] (1925). A female, aged 43 years. Duration, five years. Onset, as small brown spot on the right caruncle. The patient tried to remove the speck with a pin. Four years later, there were three such spots, which, in the course of seven or eight months, co-

alesced to form one large black dot. On examination, a black spot measuring 1.5 mm. was seen in the middle of the anterior surface of the right caruncle. It was removed by wide excision. The growth had not extended deep into the caruncle. Histologic diagnosis: melanotic sarcoma. The patient was alive without recurrence two-and-a-half years later.

25. Chapman[38] (1932). A male, aged 58 years. Duration, four years. Onset, as black spot of pinhead size. Left eye. Growth, more rapid during the last year. No history of cancer in family. No injury to the eye. Symptoms: eye slightly sensitive to touch, irritated by dust. Some obstruction to nasal breathing. General thickening of nasal mucosa, enlargement of posterior end of left lower turbinate. On examination, tumor involved entire caruncle. Dark brown, firm, protruding. Attached to ocular conjunctiva but not to sclera. Where tumor was in apposition to lids, lid margins were infiltrated with brown pigmentation. Operation: block dissection including tumor, inner side of each lid, skin of side of nose and fat from inner quadrant of orbit. Radon in glass tubes implanted about site. Six-and-a-half years later, no recurrence. Pigmented spot in skin to right of right eye; enlarging; wide excision advised. Microscopic examination of tumor of caruncle showed closely packed spindle cells with melanin scattered irregularly in the cells. Pigment dense in many places. Pigment-filled cells present beneath epithelium at border of tumor. Mitoses infrequent. Few blood vessels. Histologic diagnosis: spindle-cell melanoma.

26. Tirelli[8] (1932). A female, aged 51 years. Small black spot on left caruncle since the age of seven years. Symptomless. Stationary until injury to region from flying splinter of wood one year before examination. This was followed by progressive growth of nevus as a blue-black horizontal band. Five cauterizations in four months. Slow, steady growth continued. Ten months after trauma from splinter, tumor was size of small walnut, smooth and intensely black. Extirpated, site cauterized twice. Recurred. Examination by Tirelli one month later: Pedunculated tumor, 6 mm. long, protruding from lids, with expansion "like head of mushroom" to size of walnut. Soft, elastic, intensely black, ulcerated, adherent to free margin of lower lid. Inner third of lower lid infiltrated. By palpation it was possible to follow the infiltration back toward the orbit, circling the base of the eyeball. The main body of the tumor could be felt passing deeper into the orbit between the bony wall and the eyeball. Caruncle, semilunar fold, and ocular conjunctiva toward inner angle of eye destroyed. Strip of normal conjunctiva about 4 mm. wide remaining between pedicle of tumor and corneal limbus. Small black spots scattered over conjunctiva of lower lid. Eyeball displaced slightly upward and outward. Vision normal. Preauricular and submaxillary glands on left side enlarged, painless. At operation, the tumor was found to extend deep into the orbit through the sphenomaxillary fissure and small black spots, apparently metastases, were found on the conjunctiva. The skin and lid in contact with the tumor were removed, and the eye was enucleated. Histologic examinations confirmed origin from nevus. Structure sarcomatous. Chemical examination of pigment failed to show iron. Death nine months after operation from internal metastases. Factors noted by Tirelli: menopause and repeated cauterizations.

27. Busacca[18] (1935). A male, aged 22 years. Duration, one year. Onset, as a small black swelling. History: Operation for gastric ulcer, followed one year later by lymphogranuloma of ileum and cecum,

for which operation was performed five weeks before patient entered ophthalmic clinic for treatment of the tumor at the inner angle of the left eye. On examination, this tumor resembled a mulberry, several millimeters in width and height, oval, with the long axis running transversely. In the center of a nonpigmented area is a black elevation. Histologic findings: The tumor contained a few hairs and two types of glands: (1) sebaceous glands in the vicinity of the hairs and situated in the center of the connective-tissue stroma; (2) modified acinous glands of Krause. Pigment was present in three forms: (1) grains, (2) dark-brown lumps—both grains and lumps were intracellular as well as extracellular—and (3) true branched pigment cells, the protoplasmic processes being also filled with pigment grains. The pigment cells were more deeply pigmented in the deep parts than near the surface. Among the epithelial cells were groups of chalice-shaped mucous cells, some of which were filled with mucus. Lymphocytic infiltration was observed at a distance from the pigment. Diagnosis: melanotic lymphogranuloma. It was considered as depending on tuberculous infection of the intestine and mesenteric glands. Busacca suggests that the tuberculous infection acted on preëxisting pigment cells as a sort of catalyzer by means of toxins or of excitation of the abdominal sympathetic.

28. Busacca[13] (1935). A female, aged 45 years. A small flat spot had been present since childhood at the inner angle of the left eye. Menopause one year ago, since which time the spot had gradually enlarged. For the last two months it had been protruding and causing annoyance. On examination: a dark brown tumor, protruding slightly between lids when latter were closed. When cut, the tumor resembled a mulberry; it was deeply pigmented. Histologic findings: 3 kinds of tissue: (1) surface epithelium, (2) transition tissue of young connective tissue, with a few scattered pigment cells, (3) tumor tissue formed of stroma of adult connective tissue, old and young vessels and pigment substance in large amount. The sections contained no elements of hair bulbs, sebaceous glands, nor modified Krause's glands. Histologic diagnosis: melanosarcoma or pigmented sarcoma with nuclear mitoses and tissues of inflammatory reaction.

Busacca contrasts his two cases. In the second case, he believes that a toxic endocrine substance, thrown into the circulation during the menopause, produced a deviation from the normal in the development of preëxisting pigment cells and induced them to proliferate. The endocrine factor in this case was much more potent than the infection in the first case, since it produced not merely a tumor but a malignant tumor. In the melanotic lymphogranuloma the normal tissues of the caruncle remained fundamentally unaltered and the characters of tumor were manifested in increase of pigmented cells and in their grouping under the epithelium. In the melanosarcoma, on the other hand, the tumor mass, formed exclusively of pigmented cells, not only destroyed the original tissue of the caruncle, but caused invasion of blood vessels, transformation of epithelium from cylindrical to squamous, as in the skin, and destruction of typical adnexa (hair and glands).

29. Casanovas[39] (1935). A male, aged 16 years. Duration, one year. Growth rapid. Size attained, 4 mm. long, 3 mm. wide, 3 mm. high. On examination: rounded prominence of dark-brown color, with glistening surface, movable on underlying tissues, painless. On extirpation it was found that the melanotic mass did not go deep. No recurrence in

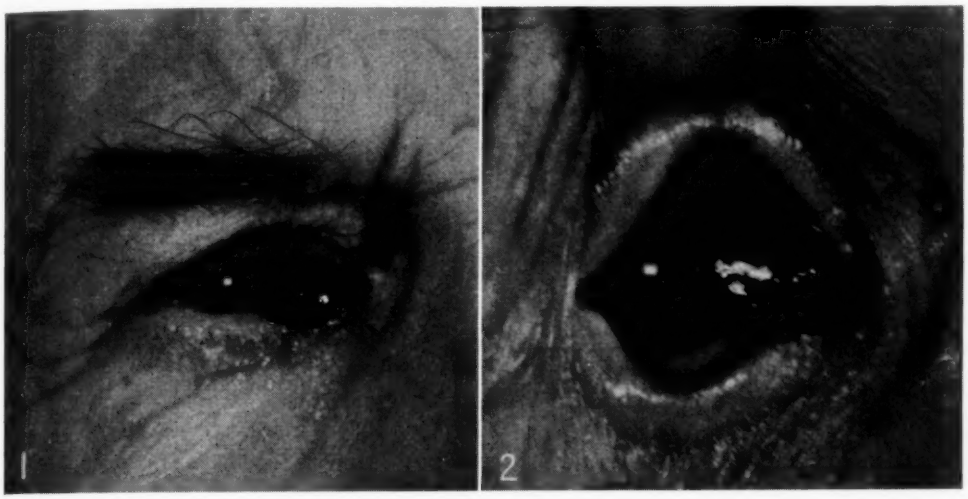
eight months' observation. Histologic findings suggest that the tumor originated in a nevus of the caruncle, which remained undetected until it developed a malignant character at puberty.

The case which I observed was as follows:

A. S., a male, aged 76 years, a retired farmer, consulted me in October, 1935, complaining of a mass protruding from the inner side of the right eye. Approximately eight years ago, while cooking eggs, he accidentally splattered some grease into the right eye. A few months later a member of his family called his attention to a brown stain on the inner part of his eye, but as it caused no annoyance he paid little heed to it. Early in 1934 he noticed that the mass was growing somewhat larger, it was then the size of a small pea and dark brown in color. For the last year the mass had been growing very rapidly; it was difficult to close the eye completely, but the only discomfort suffered was excessive watering of the eye when he was out in the wind. There was no history of bleeding.

Examination showed an uncorrected vision of 6/30 in the right eye and 6/12 in the left. A +0.25 D. sph. ⊂⊃ +1.25 D. cyl. ax. 112.5° gave a corrected vision of 6/15 + 2 in the right eye; a +0.50 D. sph. ⊂⊃ +0.50 D. cyl. ax. 80° gave a corrected vision of 6/7.5 + 3 in the left eye. Pupils reacted to light and to accommodation with a narrow excursion.

There was a large tumescent mass protruding through the inner half of the palpebral fissure of the right eye. The mass was definitely indurated, dark brown to black in color, and not painful upon manipulation. (See figures 1 and 2.) The distal portion of the mass had rounded edges, was about the size of a grape, firmly attached to the conjunctiva midway between the limbus and the semilunar fold, and the pedunculated portion of the tumor mass extended outward on the lower lid surface for a distance of 7 mm. The superior margin of the growth extended upward to the fornix; the lateral margin overlapped the limbus for a distance of 3 mm. The inferior margin extended down to the lower fornix, while the mesial portion



Figs. 1 and 2 (Wetzel). Melanoblastoma of the lacrimal caruncle.

extended to the semilunar fold and caruncle. The underlying conjunctiva was adherent to the sclera. The surrounding skin of the canthus was infiltrated with brown pigment. Between the fold and caruncle a small probe could be passed, showing that the mass had its origin in the caruncle. There was no eversion of the puncta and no cilia could be found in the caruncle. The mass measured 12 × 10 × 7.5 mm. An ophthalmoscopic examination of the right eye revealed some radial opacities in the lense downward and inward, as well as an advanced arteriolar disease. The examination of the left eye showed some radial opacities in the lens, much less marked than in the right eye. A diagnosis of melanoblastoma was made.

Operation: The patient was given a preoperative sedative one hour before operation. Four-percent cocaine was instilled into the eye together with retrobulbar injections of 2-percent novocaine solution. By blunt dissection the superior margin of the tumor and conjunctiva was dissected down to the limbus and to the cul-de-sac below. The semilunar fold and the caruncle were included in the excised mass. The underlying capsule and sclera were found infiltrated with a brown pigment and the globe was removed. The contents of the orbit were exenterated with the cautery. Recovery was uneventful and the patient was discharged from the hospital six days later.

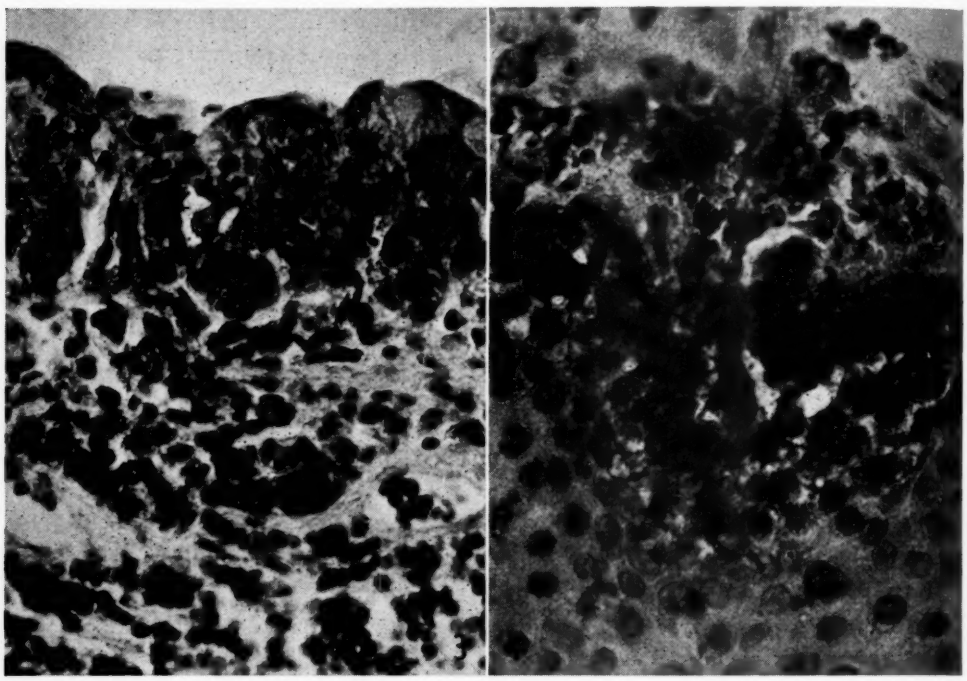


Fig. 3 (Wetzel). Melanoblastomatous infiltration of the conjunctival epithelium in the region of the plica semilunaris. ×400

Fig. 4 (Wetzel). Melanoblastomatous infiltration beneath the hyperplastic conjunctival epithelium near the limbus. ×500

Pathologic report. The dark-colored tumor mass from the region of the caruncle shows a polymorphous-celled melanoblastoma of a highly malignant type. The

younger portion of the neoplasm shows but little melanin, while the older areas are densely pigmented. One of the pieces of tissue is of special interest, since it shows a small subconjunctival dermoidal inclusion with sebaceous glands and fine hairs. Here, also, there is an abnormal melanosis immediately beneath the conjunctiva, but it does not appear to be malignant. Both the iris and pigmented layer of the choroid are unusually rich in melanin. Sections across the brownish fleck situated at the corneal limbus show the pigmentation here to be due to melanin in chromatophores extending between the basal cells of the cornea and conjunctiva. There is no evidence of malignancy in the fleck. Because of the advanced state of the melanoma at the caruncle, the ultimate prognosis must be guarded. (See figures 3 and 4.)

A brief analysis of the 30 cases shows that the male sex was represented 16 times, the female sex 12 times, and in two cases the sex was not given. Considering the small total number, the cases are spread with remarkable evenness over the entire life span, every decade up to the ninth being represented, as follows:

0-10	10-20	20-30	30-40
2	2	6	4
40-50	50-60	60-70	70-80
4	3	3	3

In two cases the age was not stated. The two benign cases (fibrolipoma and lymphogranuloma) fell in the first and third decades, respectively. If one is to consider the age of onset rather than the age at which the patient was first seen by the physician reporting the case, several of those in the third decade fall back into the second. One gets the impression that puberty exercises a certain influence in ushering in malignant changes in a preëxisting but possibly not noticed nevus. An influence from the menopause may have been a factor in the cases of three women, aged 43, 45, and 51.

Mechanical trauma to the eye is mentioned by Bergmeister[33] and by Tirelli.[8] Gillette[18] mentions as an odd circumstance, but apparently without attaching definite etiologic significance to it, the fact that his patient had been in the habit of dropping tobacco and urine into his eye to rouse himself from drowsiness, presumably by producing smarting. In Péau's case and in mine, the tumor followed four and eight years, respectively, after burn to the eye. In only three cases is there a history of pigmented nevus from childhood at the site of the tumor. In three further cases it was thought that the histologic picture yielded evidence of development from nevus. Wolfrum's case, in fact, presented the early changes from nevus into malignant tumor. A history of cancer in the family is given for only two cases.

The color is given as black, blue-black, brownish black, violaceous, grayish brown, brown, grayish red, bluish gray, and dark red. In some cases the color at the surface seems to have been mottled, as pigmented tumor portions were interspersed among nonpigmented portions.

The growth rate is given sometimes as slow followed by rapid, sometimes as gradual or progressive, sometimes as slow throughout, and more rarely as rapid from the start. In many cases the tumor first appeared as a dark spot which remained stationary for months or years.

There may be no symptoms; pain is mentioned in a few cases, lacrimation in more. Chapman's[38] case showed affection of the nasal mucous membrane. The eyeball may be displaced upward and outward. Rarely are the movements of the eyeball impeded, and vision is usually unaffected. As a rule, the general health does not suffer. The preauricular and submaxillary glands may become in-

volved, but this appears to be relatively rare.

Ten of the authors mention recurrences, often multiple. In view of the obviously inadequate treatment for malignant tumor in some of the older cases and the mistaken notions under which cauterizations have sometimes been applied to these tumors in lieu of surgery, this is not surprising. Fortunately, melanomas of the caruncle are frequently more benign than the general run of melanomas. Chapman[38] was particularly impressed by the benignity of the tumor in his case and by the value of the conservative surgery of the eye which he carried out. Against this case must be set those cases, such as Birch-Hirschfeld's[35] in which there was extensive intraorbital involvement without any symptoms suggestive of such. With adequate treatment before metastasis (which does not seem to be an early occurrence), the prognosis as to life would seem to be fairly good.

Summary

The case of melanoblastoma of the lacrimal caruncle here reported occurred in a 76-year-old man. A brown stain at the inner angle of the eye had been noticed nearly eight years before, a few months after a burn to the eye. It remained stationary for nearly five years, then began to grow as a tumor. On examination, the tumor was brownish black in color, pedunculated, and the distal portion was the size of a grape. The palpebral and ocular conjunctivae were invaded by the tumor, and the sclera was infiltrated by pigment. The globe was removed. Histologic examination showed polymorphous-celled melanoblastoma of a highly malignant type. A small dermoidal inclusion was present beneath the conjunctiva. Twenty-nine cases of pigmented tumor of the lacrimal caruncle were found in the literature. An abstract of each case is presented.

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THE CHIASMAL SYNDROME AND RETROBULBAR NEURITIS IN PREGNANCY*

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Bitemporal field defects have been described as resulting from the physiological hypertrophy of the hypophysis during pregnancy. Some authors deny the existence of such defects of the visual fields or attribute them to the psychological condition of the subject, the fields given not being typical of a chiasmal affection (Traquair[1]). This benign, physiological, perhaps even only functional condition, it is claimed, is frequent and manifests itself solely by bitemporal field defects which disappear after delivery. There is no disturbance of central vision. The optic discs and the X-ray picture of the sella remain normal. This affection will not be discussed here. However, as the following case history will show, there may occur another rare but serious pathological affection of the chiasmal type, during pregnancy, which is not generally known. It is for instance not mentioned in Wagener's[2] article.

Mrs. B., 36 years old, consulted me on August 22, 1932, because vision in the right eye was blurred in daylight; she could see much better in the dark. The mother of nine children, she was now in the fifth month of the tenth pregnancy. Vision of the right eye was 0.5 with central scotoma for colors; in the left eye 1.0, with normal fields. The diagnosis was retrobulbar neuritis and she was advised to come to the hospital for general examination.

It was not until October 17th that she entered the hospital. Vision O.D. was 2/60, O.S. normal; the fields are given in figure 1 (Oct. 18, 1932). There was a very slight pallor of the optic nerve on the right side and a slight narrowing of the retinal arteries of both eyes. Internal, rhinological, and serological examinations revealed nothing abnormal. The X-ray picture of the sella was absolutely normal (fig. 2). Her husband as well as some of the children had formerly suffered from a benign tuberculosis. Four days later she left the hospital at her own request.

She was seen again two months later (Dec. 27, 1932): vision O.D. 1/60; O.S. 1/4. On January 27th a healthy child was born. After delivery vision rapidly improved. On February 28, 1933, vision was O.D. 1/4, O.S. 1/2; on September 21st, vision O.D. was 1/2; O.S. 1.0. There was distinct pallor of the right optic nerve.

I classified the case as a retrobulbar neuritis of the chiasmal type that has been described, especially by Rönne,[3] and considered it merely coincident with pregnancy. Probably peripheral-field defects were present, but with this diagnosis in mind (central scotoma!), her nervous condition in December, 1932, in contrast to her happy mood on February 28th as vision returned, which seemed a further confirmation of the diagnosis, I failed to find them. As I had seen a great number of cases of retrobulbar neuritis, but never one in a pregnant woman in the large obstetrical hospital of this university, a relation between the neuritis and the pregnancy seemed to me at least very doubtful.

Recently I saw a woman who developed a unilateral retrobulbar neuritis with central scotoma and normal peripheral fields,

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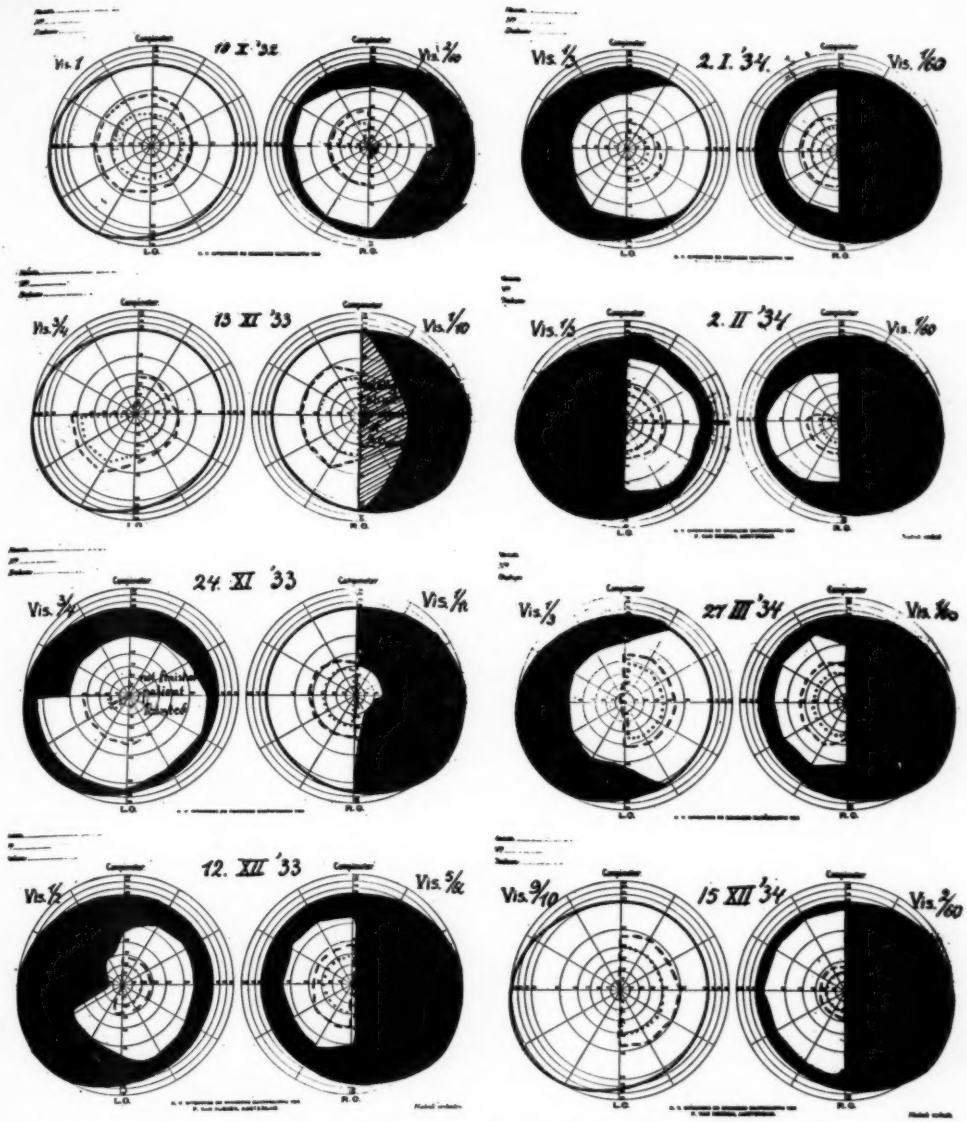

Fig. 1 (Hagedoorn). Showing progressive involvement of visual fields over a period of twenty-six months and during the course of two pregnancies: the first (tenth child) terminated January 27, 1933, the second (induced) on February 27, 1934.

Fig. 2 (Hagedoorn). X-ray picture of the normal sella turcica in this case.

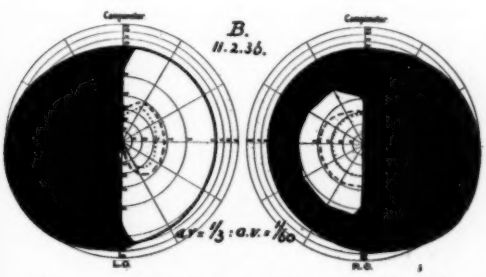

Fig. 3 (Hagedoorn). Visual fields taken February 11, 1936, just prior to operation, at which a suprasellar meningioma was found. The patient died shortly after the operation.

which, however, healed perfectly two months *before* delivery.

On November 11, 1933, Mrs. B. consulted me again. Vision O.D. was 1/10; O.S. 3/4. She was pregnant again (11th pregnancy) and in the fourth month. The fields are given in figure 1 (Nov. 13, 1933). Now it was evident at once that there must be a relation between this "neuritis" and the pregnancy. I advised a complete examination in the hospital for internal diseases (Prof. Snapper). From the extensive report I mention:

"Mrs. B. has occasional headaches and feels tired, but no more than in previous pregnancies. There is some vomiting in the morning. Nycturia (twice nightly) only during pregnancy.

"Menstruation began at 16 years of age, was always regular, every 28th day, and of 4-5 days' duration, without pains or coagulae; while pregnant some fluor. No abortion. She was never ill except for chicken pox and malaria. Her father died at 43 years of age (heart disease); her mother is healthy at the age of 62 years; eight brothers and sisters died very young, one brother at 33; two sisters and one brother are alive and healthy.

"The general examination revealed nothing in particular: There are bad teeth, the isthmus of the thyroid gland is palpable; venous swellings are apparent in the mammae; the hair covering of the mons veneris is perhaps a little less than normal, there are pigmented linea alba and a varix under the umbilicus. There had always been a varix of the major labium, this swelling did not occur in these two latter pregnancies.

"There was a very slight albuminuria, and a slight indican reaction. Sediment of catheterized urine showed: no cylinders, about 5 erythrocytes in a field; chlorium 11 percent; sedimentation velocity of blood corpuscles 25. Blood: red blood cells 4,060,000; hemoglobin Sahli corr. 74, normal differential count. Kidneys: all functional tests normal. Sugar curve of the blood was normal. Blood pressure 155/85; 115/75; 125/75; 115/65; 145/75 (emotion) on consecutive days."

Rest and a saltfree diet were prescribed.

The patient was transferred to the obstetrical hospital, where the possibility of a toxemia of pregnancy was suggested. On December 4th and 11th 10 c.c. of normal blood serum of a pregnant woman was injected; on the 18th 10 c.c. of horse-blood serum. The course of vision and fields are shown in figure 1.

The last time that I could examine the patient was on February 2, 1934 (fig. 1). Vision was O.D. 1/60; O.S. 1/3, sufficient indication that termination of pregnancy should be considered. Labor was induced on February 27th. The patient stated that at that time she could hardly distinguish between daylight and dark. On account of obstetrical difficulties the child, who showed no abnormalities (1700 grams, length 41 cm.) died. After that vision was slowly regained and on December 15th was O.D. 2/60; O.S. 9/10. This history will be continued somewhat later.

The visual fields definitely indicated a suprasellar lesion affecting the optic chiasm. The diagnosis of suprasellar tumor, which is most probable, seemed, however, not to be confirmed by similar cases published. These are briefly outlined, as follows:

Case of Patry.[4] At the age of 27 years there was disturbance of vision in the fourth pregnancy; abortion in the second month. At 30 years, in the fifth pregnancy bad sight developed in the right eye, beginning probably in the second month, resulting in practical blindness in the fifth month. The left eye was good at that time; 1½ months later, however, the latter became worse, with concentric contraction of field, but considerable in the upper outer quad-

rants. Premature delivery. Shortly thereafter, in the sixth pregnancy, there was failure of vision; abortion in the second month. Optic atrophy, bitemporal hemianopsia.

The retinal arteries were very thin in this case.

Case of Jung.[5] Binocular failure of vision occurred in a woman 45 years old, after menstruation stopped (tenth pregnancy). During the sixth-seventh month there was rapid progress, bitemporal hemianopsia. As vision was reduced to 1/300 O.D.; 1/60 O.S. termination of pregnancy was brought about by abdominal hysterectomy. At the same time tubal sterilization was performed. There was rapid recovery, nine weeks later vision being O.D. 1/6; O.S. 1/2.

The sella was "enlarged," with thin bottom and dorsum; pronounced vessel impressions. The right disc was atrophic, the left disc pale. Probably no recurrence of symptoms (personal communication).

Case of Viedowsky.[6] A patient 34 years old, who had always suffered from headaches, especially before menstruation, remarked a progressive failure of vision of the right eye from the onset of her second pregnancy. In eight months the vision of this eye was reduced to less than 1/60. There developed a slight ptosis, optic atrophy, hemianopsia of the right eye, hemiachromatopsia of the left eye. X-ray treatment was instituted, 5 series of 4-5 exposures. According to communications from the patient, who returned to her home in the country, there was marked improvement. After delivery vision returned in 6 months. X-ray picture: "enlargement" of sella, but no definite atrophy of the walls.

Case of v. Reuss.[7] In a woman of 31 years the left eye became blind in the 14th pregnancy. In the 15th pregnancy there was diminution of vision to perception of light only with partial recovery. In the 16th pregnancy because of recidivation, the pregnancy was interrupted artificially. In spite of optic atrophy and bitemporal hemianopsia, 30 years later the vision was still adequate and there were no other symptoms.

In all these cases vision was restored more or less completely. Only in Fehr's case, though the process was not progressive, was there no improvement after delivery.

Case of Fehr.[8] Visual disturbance developed in the second pregnancy; there was no definite amelioration after the birth of the child. Bitemporal hemianopsia and pale papillae developed. Enlargement of sella. Ten years later there was no change. Vision in both eyes was 5/20.

Viedowsky, Jung, and other authors found slight changes in the sella by X-ray examination. However, one should be extremely cautious in diagnosing a pathological sella. In Shimkin's[9] case, however, the destruction of the walls of the sella was very evident; the cases of Winter[10] and Rauh[11] also seem to have shown a definitely pathological sella.

Case of Winter. A woman, 19 years old, had a disturbance of vision in two successive pregnancies, with enlargement of the sella. Between the two pregnancies there was no progression. Supravaginal hysterectomy was performed in the second to third month of the second pregnancy.

Case of Rauh. There was failure of vision in two successive pregnancies with concentric contraction of fields, most pronounced in the nasal parts; also enlargement of the sella.

Case of Shimkin. The first pregnancy (at the age of 24 years) was normal. In the fourth month of second pregnancy (1½ years later) severe headaches, atrophy of the left optic disc, bitemporal hemianopsia were present. The X-ray examination showed a slight enlargement of the sella with atrophy of the dorsum. Abortion was induced. One year later a third pregnancy was complicated by progressive failure of vision. The patient refused abortion, and a healthy child was born. The left eye remained blind from optic atrophy, the right eye showed a temporal pallor of disc. Six years later there had been no further pregnancies, and the vision remained the same. X-ray examination revealed progressive atrophy of the dorsum sellae and of the posterior clinoid process.

Evidently in this latter case there was a tumor of the sellar region. In other cases the presence of a tumor of this type was made probable by symptoms of disturbance of internal secretion.

Case of Gros.[12] A patient of 28 years, in her first pregnancy experienced failure of vision in the seventh month, with rapid progression, so that one day before delivery there was only perception of light. Rapid improvement occurred after birth, 5 weeks later vision being O.D. 5/8; O.S. 5/50, with bitemporal hemianopsia. A year and one half later vision was O.D. 5/6; O.S. 5/8 with considerable enlargement of the sella; adiposogenital dystrophy; after this

birth no menstruation. The patient did not return for further observation (personal communication).

Case of Frankl.[13] In the seventh month of pregnancy occurred a rapid total loss of sight; after delivery there was normal vision; no fields are given. Acromegaly developed, and the sella deepened.

Case of Böck.[14] In the fourth month of the fourth pregnancy in a patient, 37 years old, a progressive failure of vision was noted in the right eye with pallor of the right disc, and temporal hemianopsia developed. Recovery followed after delivery. There were mild signs of a disturbance of internal secretion; hypertrichosis of the axilla and genitalia, eyebrows short, the temporal part failing, hyperpigmentation of the skin, and linea alba.

Thus different conditions in the sellar region may cause the impairment of vision.

In Marek's[15] case signs of disturbed internal secretion appeared, while vision remained normal; there were glycosuria and acromegaly. Complete recovery after delivery. Slight acromegalic symptoms in pregnancy are frequent accordingly to some authors. Recently I saw a similar case with normal eyes and fields.

In the two cases of Fischer[16] a tumor proved to be present, which was progressive after delivery, though a temporary improvement occurred in the first case.

Case of Fischer. Disturbance of vision in the first pregnancy, with eclampsia. Aged 36 years, in her second pregnancy, in the seventh month, vision of the left eye was less than 1/60 with bitemporal field defects; in the eighth month there was total blindness. Rapid recovery occurred immediately after delivery so that after four months vision O.D. was 6/8; O.S. 6/6. Healthy woman, blood pressure 120 R.R. Treatment: X-ray: 7 times three exposures; praephyson injections, however without success. One year later: vision was O.D. 1/6, with pale optic disc and temporal hemianopsia. In the left eye a color defect in the upper temporal quadrant. X-ray treatment was given. One and a half years later there was, O.D. and O.S., complete temporal hemianopsia, vision 1/6 in both eyes, and both discs were pale. X-ray treatment, vision O.S. 1/60. Normal sella. Twenty-one months later, the patient died following an operation for a tumor in the sellar region. An endothelioma dura matris (meningioma) was found in regione sella turcicae marginis anteriores, part of which projected into the sella. There was compression of hypophysis, the optic nerves were pushed aside, the chiasm backwards. Compression of the optic nerves between the tumor and the internal carotid arteries.

Fischer's second case. Woman 27 years old, first pregnancy. In the fifth month there was failure of vision with bitemporal hemianopsia. Vision was O.D. 1½/60; O.S. 1/4. Abortion was induced. Thereafter, however, there were progressively hazy discs and hemorrhages. At operation a cystic tumor of the stalk of the hypophysis was found.

Fischer, who made a very complete study of his cases, mentions three cases of Hirsch, in which a tumor developed some years after the last pregnancy, and cites cases of Gottfried and Wilbrand and Saenger (4 cases); furthermore two cases of Hirsch in which visual disturbance was progressive after delivery (thus resembling Fischer's second case). In one of these cases there was a temporary improvement after delivery. He cites similar cases of Luque (3 cases). Fischer believes that pregnancy may be an etiological factor in the development of these tumors, though in his statistics (Hirsch) 36 male and only 31 female patients appear. His cases show only that a suprasellar tumor does not prevent pregnancy and that pregnancy is not a prophylactic against tumors, as nursing seems to be in mammary carcinoma (Ewing).

Perhaps an influence on true adenomas must be admitted, but for this, data have as yet to be collected. Erdheim reported finding adenoma of the chromophile cells in four cases of gestation hypertrophy, whereas gestation causes hyperplasia of the chromophobe cells.[17]

In addition to tumor, however, there is still the possibility of retrobulbar neuritis, since the majority of cases seem not to have shown a progressive course after the last pregnancy. Disturbance of vision in the pregnant healthy woman is attributed

to this cause in the earlier literature and in modern textbooks, whereas bitemporal hemianopsia is rarely recorded in the earlier literature, and, if mentioned, the diagnosis of a chiasmal affection was not made, as for instance in the case of Knaggs.[18]

Case of Knaggs (1896). In a woman 32 years old optic atrophy of the left eye developed during pregnancy. After that she had 4 children. In a following pregnancy at 40 years rapid failure of vision occurred in the fourth month (less than 1/60). In the sixth month labor was induced. Vision was completely restored in the right eye. In a following pregnancy there was recidivation, and abortion was induced. There were visual-field defects of the temporal, superior, and inferior quadrants. In the discussion of this case Nettleship remarked that it had to be considered as a chiasmal affection.

Alpers and Palmer[19] collected but forty cases of (retrobulbar) neuritis associated with pregnancy from the literature. Berger[20] mentioned a few other cases. Many of them were insufficiently investigated. Reuter[21] did not mention the condition of the visual fields. Uhthoff devoted four lines to his four cases. Of the six cases Weigelin[22] described, two showed temporal hemianopsia, one a central scotoma between the fixation point and the blind spot.

As Kubik,[23] Knapp,[24] and Zeeman[25] have emphasized, central scotoma occurs in chiasmal affections, which may then be easily mistaken for a simple retrobulbar neuritis.

In the recent literature cases of (retrobulbar) neuritis associated with pregnancy are extremely rare (Bailliart,[26] Kogan[27]). Neither in the earlier literature nor in the rare recent cases is there any mention of a combination with polyneuritis of peripheral nerves as is stated in textbooks on obstetrics (de Lee[28]).

If symptoms of the peripheral nerves were to appear this would probably be a myelitis rather than a polyneuritis, as the development of this disease seems to be promoted by pregnancy. It may be associated with optic neuritis in nonpregnant subjects (neuromyelite optique aigue).

Optic neuritis associated with pregnancy is reported frequently in the earlier literature; however, the possibility of pseudopapillitis is not mentioned.

As similar conditions are practically not found in other parts of the central nervous system, it is probable that the syndrome described must be associated with the physiological hypertrophy of the hypophysis in pregnancy. Alpers mentions one case only:

Case of Nolen. A woman 40 years old, developed in her 12th, 13th, and 14th pregnancies drowsiness, right hemiparesis, tremor of the paretic arm and contralateral oculomotor palsy. In a few months after delivery she was perfectly well, and has remained so for ten years after the birth of her last child.

My case and Patry's showed narrow retinal arteries. Visual disturbance (in a nonpregnant patient) with fields definitely indicating a lesion of the chiasm, probably of vascular origin, has been described by Zeeman.[25] Favory[29] states that lues may cause the chiasmal syndrome. In all published cases where the Wassermann test was done this was negative; only Fornero[30] records a luetic etiology. Though not only in pathological pregnancies (Mylius[31]), but also in normal pregnancies (Kyrieleis[32]) vascular spasms are claimed to have occurred, I believe that in the described cases vascular origin was extremely improbable. These were my considerations when I presented my patient to the Dutch ophthalmological society in 1934.[33]

After Fischer's last publication in 1935, in which he stated that a suprasellar tumor was the cause of the symptoms in his case, I summoned my patient, whom I had not seen again, for reëxamination. The visual fields (fig. 3) and vision

showed a considerable deterioration, which made the diagnosis of suprasellar tumor highly probable, hence operation was advised.

A large suprasellar meningioma was indeed found, a severe hemorrhage from the tumor was difficult to control, and the dark tumor was seen. This tumor had a capsule and it was not difficult to separate it from the dura covering the hypophysis. This dural roof was normal. The tumor slightly protruded on both sides in the middle fossa, but projected considerably into the posterior fossa in the direction

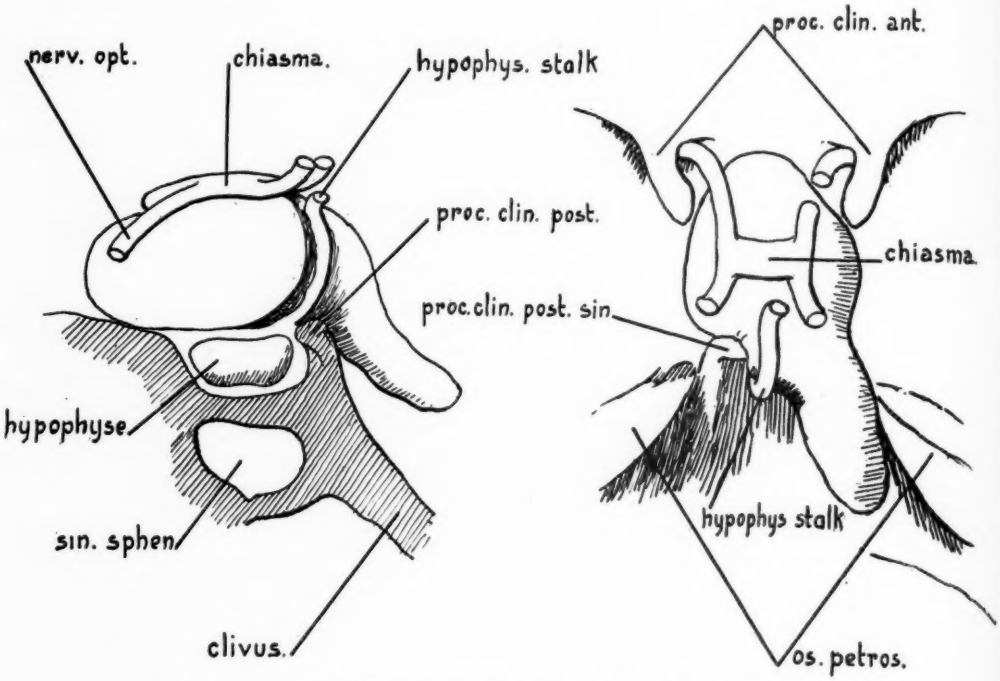

Fig. 4 (Hagedoorn). The topography of the tumor found at operation.

patient died a few hours after the operation. The pathologist found the hypophysis and optic nerves embedded in a large meningioma.

A summary of the report received from the pathological laboratory of the University of Amsterdam (Prof. H. T. Deelman and Dr. H. M. van der Linde) follows:

The frontal lobe was damaged by the efforts to control the bleeding. After removal of the frontal lobes the chiasmal region was exposed. Posterior to the anterior clinoid process—instead of the optic nerves and the chiasm—a large soft of the foramen magnum. The right optic nerve was damaged and not continuous with the chiasm. The left optic nerve was present as an elongated, not flattened but round strand running from the optic foramen to the chiasm on the surface of the tumor but not embedded in the substance of the tumor as the right nerve was before the operation. The diagram (fig. 4) shows the topography of the tumor as it was found by the pathologist. It was bounded anteriorly and superiorly by the chiasm, posteriorly by the stalk of the hypophysis and inferiorly by the roof of the hypophysis. The vessels in the neigh-

borhood of the tumor were not damaged, so that the fatal hemorrhage must have developed from the vessels in the tumor. The right anterior-superior part of the tumor was irregular, infiltrated with blood, and showed the silver clips used during the operation to control the bleeding.

Microscopically: a tumor with a definite bundle-shaped arrangement of cell elements, characteristic of the endotheliomata; there is also an onion-shaped arrangement around the vessels. As is clear from the photograph (fig. 5) it seems to be a typical case of endothelioma.

CONCLUSIONS

In pregnant women, perfectly healthy in other respects, may occur a gradually progressive failure of vision and temporal hemianopsia, usually affecting only one side in the beginning, but becoming binocular in the course of the pregnancy. (In my case the first evident symptom was a unilateral central scotoma.) At that time, generally, the seventh month of pregnancy has been reached. Optic pallor or atrophy may follow. The condition generally returns earlier and more seriously in a following pregnancy and may lead to invalidity.

Nearly always the symptoms disappeared more or less completely after delivery, amelioration beginning even in the first days after delivery.

If the sella is normal this clinical picture may be caused by the affections listed by Cushing,[34] of which suprasellar meningioma is the most frequent and important, the symptoms of which become manifest only by the physiological hypertrophy of the hypophysis during pregnancy. Though such a tumor was found in Fischer's patient and in mine, and may probably have also been present in a number of the reported cases, still other histories have been published in which the symptoms were certainly not progressive after the birth of the last child.

In addition to the possibilities stated by Cushing, the possibility of retrobulbar neuritis in pregnant women must be considered, which disease is stated to occur in pregnancy. A study of the literature shows that simple retrobulbar neuritis is extremely rare; some of the cases published show the characteristics of a chiasmal affection. In the future, in cases of (retrobulbar) neuritis in a healthy pregnant woman special attention should be given to the visual fields. In a case of my

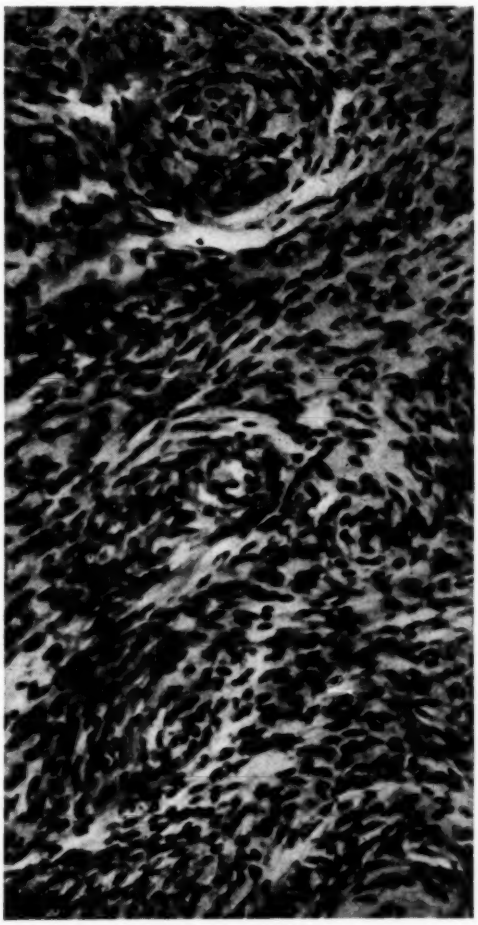

Fig. 5 (Hagedoorn). Photomicrograph of tumor tissue.

own, healing took place three months before delivery, which does not speak in favor of pregnancy as the etiology.

A definite course of treatment is difficult to recommend at the present stage of our knowledge.

In cases with bitemporal hemianopsia, if vision in the better eye diminishes to 1/3 to 1/2, pregnancy should be terminated. If abortion is refused, one may wait till vision in the better eye is 1/10. If a living child is not possible at that time I believe treatment by the neurosurgeon is indicated. This has not been done up till now. Generally it will prove possible to obtain a living child from the first pregnancy in which the syndrome occurs.

A following pregnancy should be avoided. If the woman seriously wants a child a second pregnancy may be permitted provided one eye at least has regained full vision. A living child is possible without invalidity for the mother. It is a great risk however! In my case the Catholic authorities did not permit sterilization. If an expert neurosurgeon is available, an exploratory operation seems most preferable, as it is also in a case of suprasellar syndrome not combined with pregnancy. The fatal result in my case is partly due to the advanced stage in which it came under surgical treatment, so that an early operation seems preferable. The indication for operation is difficult, as nonprogressive cases are reported. Only further observations may lead to more precise therapeutic indications.

SUMMARY

A review is made of the published cases which showed a chiasmal syndrome in pregnancy. In a case under the author's observation a suprasellar meningioma was found *post mortem*. A tumor has been reported by other authors; there are, however, still other cases published in which symptoms disappeared or remained stationary after delivery. The patients in some of these latter cases could be studied over a short period only and did not return for reëxamination. Retrobulbar neuritis in pregnancy is very rare; it is not associated with neuritis of peripheral nerves. If retrobulbar neuritis develops in pregnancy, a very careful study of the fields should be made repeatedly. The fields in some published cases diagnosed as retrobulbar neuritis in pregnancy show the characteristics of a lesion in the hypophyseal region.

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DIMETHYL-SULPHATE POISONING IN RELATION TO OPHTHALMOLOGY*

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Dimethyl sulphate [$(CH_3)_2SO_4$, molecular weight 126] is the dimethyl ester of sulphuric acid and is obtained from the action of methyl alcohol on anhydrous sulphuric acid or chlorosulphonic acid below 0°C; following which the resulting methylsulphuric acid is distilled in a vacuum, and is cleansed by bubbling through water and drying. An oily, colorless liquid of not disagreeable odor, it dissolves in alcohol, chloroform, benzol, and ether, and is insoluble in water (only in the presence of alcohol can a watery solution be made), oil, or sodium carbonate. Its specific gravity is 1.33344, its boiling point 188°C., and at 50°C. it vaporizes. Its liter weight as a gas is 5.28 grams, and as a volatile liquid at 20°C. (2.5 c.c., that is, 3.3 mg.) 1 gram. The density in its liquid state is 1.33 and in its gaseous state 6.1.

Generally used in chemical laboratories for purposes of methylization (codeine from morphine), it is also used in the examination of fuel for automobiles. In testing for benzol in benzine, dimethyl sulphate reacts with the benzol and the benzine collects at the top of the liquid, making it possible to read the ratio on a percentage scale.

Dimethyl sulphate is an extremely strong poison, working directly if the liquid comes in contact with the surface of the body, or indirectly when inhaled as a vapor. The most frequent cause of poisoning by this agent is the breaking of the container. In the World War this substance together with chlorosulphonic acid —irritating gases which split off hydrochloric acid—was used mainly by the French. The Germans called it "D Stoff" and the French "Rationit." It was declared a tear gas because of its primary irritating effect. In reality it is irritating and corrosive, the latter characteristic becoming manifest later.

Experiments to determine the mechanism of its effect were performed by Weber[11] and Wachtel.[12] Dimethyl sulphate enters the body as a molecular unit. In the tissues it slowly hydrolizes into sulphuric acid and methyl alcohol. The toxic effect is dual in that it is related to the complete molecule and to the acid root which splits off. Weber claimed that only the whole molecule has a poisoning effect. Wachtel disproved this theory and emphasized the effectiveness of the acid component at least in respect to the local changes—corrosion. This idea was strengthened by Lynch, Smith, and Marshall. To be sure, the methyl alcohol formed from the splitting of the ester and the formaldehyde resulting from it cannot be disregarded. Because of its methyl component this substance stands alone among the esters that have a narcotic effect, and of all such esters it is the most poisonous. As to the other esters, if they have a narcotic effect, it is the result of the complete, unbroken molecule; in the case of dimethyl sulphate, however, the toxic effect appears independently of the narcotic effect and is probably the result of the formaldehyde. Dimethyl sulphate is a strongly corrosive substance, especially to the mucous membranes of the eye and of the respiratory tract. Absorption appears only after an intake of large

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amounts; in these cases, in as much as it is a central-nervous-system poison, spasms, decrease in the blood pressure, and paralysis appear, as has been demonstrated by the administration of dimethyl sulphate to animals by stomach tube, subcutaneously, or intravenously. Small inhaled amounts are neutralized by the blood and there are no central effects. According to Wachtel, dimethyl sulphate checks the catalytic enzyme of the blood —even in a dilution of 1:50,000 is it possible that this factor also plays a part in the bringing about of the poisoning. Inhaled dimethyl sulphate is more toxic than that given intravenously. Its vapor on coming in contact with the skin is harmless; on damp mucous membranes, however, by the splitting of the ester sulphuric acid, especially in the presence of alcohol, a watery solution is produced much more rapidly and with it the formation of the acid is accelerated. Liquid dimethyl sulphate causes secondary and tertiary burns of the skin and, according to Weber, the gases evaporating from the warm skin may have serious effects upon the respiratory system. Dimethyl sulphate remaining on the clothes can also cause delayed toxic reactions.

The poisoning in animals takes the following course (Flury and Zernik[4, 13]): it begins with slight salivation and lacrimation and a reddening of the visible mucous membranes. One or more hours later blepharospasm appears, then pus pours from the eye and nose; later respiratory disturbances appear with coughing accompanied by bronchial rales. The animal becomes restless, dyspneic, phobic, soporous, then comatose, and a few days later expires. Necropsy findings reveal a yellowish-brown, completely destroyed, corroded trachea and bronchi with involvement to the most minute bronchioles. In the lungs, hyperemia, hemorrhages, emphysema, edema, bloody induration, and pneumonic foci appear. Wachtel recorded a lowering of the blood pressure and slowing of respiration.

In Flury's book on noxious gases, detailed reports can be found concerning the lethal dose for cats and guinea pigs. In monkeys, 0.066 mg. (12.8 c.c.), after a twenty-minute exposure, causes a serious toxemia in 6 hours; 0.132 mg. (25.5 c.c.), after an exposure of 40 minutes kills the animal within three days.

In man the symptoms of a light case of poisoning are as follows: swollen lids, photophobia, and conjunctivitis which sometimes appears with a pseudomembrane. Mainly the mucous membranes of the nose, larynx, and pharynx are swollen and congested. The patient complains of a dry, painful cough and pricking in the larynx which ceases in one or two days. The photophobia, hoarseness, and the feeling of dryness in the throat remain for a longer time.

In the more serious cases, as a result of stronger corrosion, we find a fine, white pseudomembrane on the conjunctiva and the respiratory tracts. The swelling of the larynx and pharynx is more pronounced. Necrotic nasal mucous membranes and an edematous epiglottis complete the picture. Foaming saliva flows with difficulty. The entire mucous membrane of the bronchi is corroded. The patient may run a normal temperature and recover but pneumonia may also develop.

In a grave case, extensive corrosion of the mucous membrane is found, especially in the bronchi; six to eight hours later serious dyspnea, restlessness, and pneumonia develop; 10 hours later a high fever appears; three to four days later a gradual weakening of the heart results in death. Sometimes jaundice and nephritis accompany the end. Expectoration is impossible because of the great tracheal edema. Occasionally tonic and clonic

spasms occur; however, a large degree of absorption is necessary for this (the neutralizing power of the blood has been mentioned). In animal experiments a decrease in the blood pressure has been noted but not in man.

Wachtel differentiated three types, as in phosgene poisoning: (1) Primary lung edema, secondary weakening of the heart, and congestion develop in all of the organs because of the damage done to the alveolar epithelium. (2) There are a pseudomembranic pharyngitis, laryngitis, and tracheobronchitis with an absence of pulmonary edema. (3) A general capillary lesion develops a gradual weakening of the heart, or a toxic cachexia dominates the picture—there is a lack of change in the respiratory tract; this is the form of the appearance of poisoning by absorption. The mixed form, however, is frequent. What are the conditions that lead to the different types? It seems that in the case of a large dose, irrespective of the intake, the poison is absorbed unchanged and attacks the central nervous system and heart. Minimal doses inhaled for a length of time are absorbed without causing any local effect but do cause chronic poisoning and cachexia. The time of exposure and the concentration are of more importance than the absolute dose.

Clinical reports

The first report was made by Weber, two of whose three patients died. The notes of Strothmann[10] are interesting. Three workmen were busy testing motor fuel (benzine, benzol, and monopolin). In the examination of monopolin, corrosive gases developed. Monopolin contains 30 percent denatured alcohol, and since alcohol has a lower boiling point than the reagent dimethyl sulphate, it is possible that the latter substance evaporated together with the alcohol. He noticed an especially serious poisoning in one of the workers who had rinsed out the used bottles with boiling water. This man was admitted to the ward with cyanosis and dyspnea; eight hours later a serious edema of the lungs developed accompanied by a great degree of dyspnea. Following the administration of a 4-percent sodium-carbonate infusion and an adrenalin spray the severe symptoms slowly regressed and the patient was left with a dry inflamed pharynx and conjunctiva. The other two workers showed only a mild reaction without any anatomical changes.

Boskowitz[2] presented the case of a 21-year-old laboratory technician who was the victim of the same accident that was responsible for the three cases I shall refer to later. This patient was exposed to the gas for three hours. After a latency of 13 hours, edema of the glottis developed. In spite of immediate treatment a laryngotracheo-bronchitis appeared followed by cardiac failure; the patient died of pneumonia. Mohlau[7] also had two similar cases but the report was not accessible to me.

Therapy

The procedure is as in the treatment of other irritating gases. Ice packs are placed on the neck and chest, and inhalation or spraying of a mentholated soap is prescribed. A spray of adrenalin for a few minutes every half hour is successful in diminishing the tracheal and pharyngeal edema. The rapid regression of the edema results in easier expectoration. The strengthening of the heart with strophantine, camphor, or caffeine is important. In case of edema of the lungs, the use of oxygen inhalations, venesection, and infusions is advisable; also calcium intravenously. In combating pneumonia, transpulmin* injections, even as prophylactic measures, are valuable. Antidotes used in time may help but are usually ineffective in serious cases. The treat-

* Aromatic oils, camphor, and so forth, and quinine.

ment of the eye will be mentioned later. In spite of the great pain, morphine derivatives are contraindicated because of the danger of pneumonia and respiratory paralysis; the checking of the cough reflex may result in the inhalation of the poisonous vapor into the deeper bronchi.

Chemical industries are beginning to realize the toxic character of this compound; therefore, in the examination of an unknown material extreme care is indicated. In any case it is advisable that workers dealing with dimethyl sulphate wear gas masks which adequately protect the eyes and respiratory tract. A sponge dipped in an alkaline solution should be placed under the oxygen tank to absorb and neutralize the poisonous gases (Strothmann).

Prognosis

The prognosis in light cases is good, in more serious cases it is uncertain because of the danger of secondary infection (pneumonia and aftereffects). In serious poisonings, if after 10 hours high fever and pneumonia should be present, the prognosis is grave; respiratory difficulties appear because of the swollen trachea and pharynx. The patient becomes exhausted in the effort to breathe. Later he suffocates because of the amount of bronchial secretion. Since the symptoms of corrosion become more serious with time, every one exposed to the poison (with the exception of very slight cases) should be taken to a hospital. Among the aftereffects are chronic bronchitis, bronchiectasia, and chronic hoarseness together with a dry laryngitis. A chronic hypersensitive condition of the mucous membranes remains for a period of time. Abscess of the salivary glands also plays a part among the secondary infections.

Injury to the Eye

Although the foregoing data are of general toxicologic interest, it is absolutely necessary to know them in order to understand the injury to the eye.

The first data concerning ocular involvement were reported by Weber in 1900. Among his three cases he found in one an escharotic conjunctiva, in the others only an obstinate conjunctivitis accompanied by a great degree of lacrimation and blepharospasm. In 1902 Erdmann[3] noted the case of a chemist working with dimethyl sulphate who reported six hours later with a serious irritation of the conjunctiva. Subsequently the epithelium of the cornea became roughened and finally opacities were formed. The swelling and opacity of the basal tissue of the cornea later disappeared without a trace. The author performed many animal experiments for the purpose of explaining the ocular symptoms. In one of the series the animal (rabbit and guinea pig) was placed in a 20-liter bell jar containing a cup of 20 c.c. of dimethyl sulphate for the purpose of evaporation; one eye was closed by a plaster. In the other series only the eye was exposed to the effect of the gases by having placed before it a 25-c.c. eye bath in which lay a piece of cotton soaked with 20 drops of the solution. Histologic examinations were made after one-quarter, 2, 4, 7, and 19 hours and after 2, 3, 5, 9, 30, and 58 days; in the meantime the clinical changes were observed. In the first series the time of exposure varied between 15 and 60 minutes; generally 10 minutes was adequate to bring about the typical lesions. In the second series 10 minutes was the time of exposure; here two minutes proved to be enough. From these observations Erdmann concluded that dimethylsulphate vapors produce on the eyes of man and animal the symptoms of a serious inflammation, mainly in the cornea. These symptoms are lacrimation, swollen eyelids, pain, photophobia, and chemosis of the bulbar conjunctiva; they reach their fullest intensity within 29 hours and

then slowly regress. There is a vesicular detachment of the epithelium of the cornea, and initial deep opacities appear. The cause of the latter is the edema of the parenchyma in consequence of the hydrophic degeneration and detachment of the endothelial cells; so that aqueous humor infiltrates between the layers of cells. Fluorescein easily diffuses through the swollen edemic cornea into the anterior chamber. Furthermore fluorescein given intravenously is imbibed from the aqueous humor into the cornea. The vesicular detachment of the epithelium is produced by liquid collecting between the shrunken and loose basocellular layer and the parenchyma. Although the imbibition opacity of the cornea subsides after the regeneration of the endothelium, there remain fine, dotted, deep opacities due to slight inflammation. The severe and obstinate symptoms and the permanent visual defect demand the greatest attention.

However, we must remark the following about Erdmann's work; he, influenced by Weber, blames the unchanged dimethyl sulphate as the source of the symptoms, whereas we know today that they are chiefly the result of the effect of the sulphuric-acid root. The conjunctival pseudomembrane and the permanent serious injury of the cornea are in reality the effect of only rarely occurring concentrated vapors. In order to obtain marked histological lesions it was necessary, however, to increase the severity of exposure and as a result of this many of the animals died suddenly from edema of the glottis during the experiment.

In 1911 Adams and Cridland[1] reported a case in which the effect of the vapor caused congestion, chemosis, and fine deep corneal opacities. Smell and taste were also lost for a short time, then a slight contraction of the fields appeared with pallor of the disc. Recovery was complete.

In 1919 Kristyory[6] reported two cases in a chemical factory where 50 gm. of dimethyl sulphate was spilled. In the beginning it caused no complaint; later, however, lacrimation and pains in the eye surprised the workers. The symptoms in two of the workers disappeared after a short treatment so that they resumed their work; subsequently, however, there was a recurrence of symptoms due to repeated exposure. While in the case of one worker there was only photophobia accompanied by a slight hyperemia of the conjunctiva, the other showed signs of a serious conjunctival irritation and furthermore a roughened cornea and hyperemic iris. The therapy consisted of a cool bath of boric-acid solution with atropine and oil drops. A week later the edema of the eyelids and the photophobia had improved; in another two weeks the eye was quiescent but fine opacities remained on the right cornea. Vision was 5/10 and 5/5. It may be mentioned that the latter patient had been treated for trachoma eight years before, which, perhaps, caused a hypersensitivity of the tissues.

In November of 1933, I had the opportunity to study three cases, reported previously,[5] to which I am now adding a fourth case:

Case 1. At 11:30 p.m. on November 24, 1933, a 30-year-old woman reported at the University Eye Clinic No. 1. She stated that at noon of that day, at approximately 1 o'clock, a jar of dimethyl sulphate broke in the cellar of a chemical factory where she was employed. She was on the first floor. About an hour later her eyes began to itch. At night a cough surprised her and her voice became completely hoarse.

Our findings were as follows: There were a strong photophobia and blepharospasm, both eyelids being swollen and red with a small degree of chemosis. The entire surface of the cornea was rough but the pupillary reaction and the fundus were normal. On November 27th, both eyes showed ciliary injection, a small degree of photophobia, and dilated episcleral and conjunctival blood vessels. With the slitlamp the cornea was found to be normal. The pupils were dilated by scopolamine and the vision of both eyes was 5/5.

On December 5th, the eyes, which by this time had quieted down, were again inflamed. Conjunctival and ciliary injection was noted,

The slitlamp revealed dilated tortuous blood vessels. At the limbus, on both sides, below and above, was seen a crescent-shaped opacity into which a fine network of blood vessels entered. Vision in each eye was 5/10. The voice was still slightly cracked.

On December 13th each eye had a vision of 5/5 with correction; conjunctival and ciliary injection, dilated blood vessels, and widened limbal network were noted.

Case 2. On the afternoon of November 25th at 2 o'clock, a maid came to the clinic, stating that her employer had broken a bottle in the factory, and that at approximately 2 o'clock she had cleaned the suit upon which the liquid had been spilled and polished his shoes. About four hours later a rasping of the throat and lacrimation surprised the patient; she could scarcely open her eyes. Since then she had had a cold and a hoarse voice.

Our findings were as follows: On both sides, the upper as well as the lower skin of the eyelids was slightly edematous, the tarsal and bulbar conjunctivae were injected, and strong lacrimation and blepharospasm were present. The surface of each cornea was roughened; moderately dilated pupils were found, but otherwise normal conditions. On the morning of the 26th, the corneal changes could not be seen; the corneae were lustrous and only slight conjunctival injection was present. On the right, corresponding to the palpebral fissure, there was a hemorrhagic suffusion but normal tension. Vision in each eye was 5/5. The voice was hoarse, almost aphonic, and some coughing was present. Diagnosis: Subacute laryngitis.

December 6th, with a slitlamp, I saw expanded and tortuous blood vessels, a normal limbus, and a normal cornea. In cold weather, she said, or in dusty and smoky places her eyes readily became inflamed. She had retrosternal pains and was aphonic; her vision was normal. The findings of the laryngological clinic were hysterical aphonia with normal respiratory tract.

Case 3. On December 6th, a third patient reported, a 22-year-old factory worker who had remained for 10 minutes in the room in which the chemical was spilled. This happened at 5:00 p.m. and at 11:00 p.m. strong lacrimation and burning appeared in both eyes. The symptoms receded, but three days later her eyes again became inflamed. According to the patient's statement, she had had a fever for three days, she coughed, choked, and eruptions developed around her mouth. On admission there was a slight congestion of the conjunctiva on both sides, especially in the region of the palpebral fissure, a normal lustrous cornea, normal iris, and moderately dilated pupils. The slitlamp showed the limbal region to be circularly edematous along the course of the blood vessels, and red spots (red corpuscles) were visible.

The blood vessels were slightly more than normally dilated, and the capillaries were well visualized. The limbal network spread over the periphery of the corneal surface. At these places there was a slight haziness in the deeper layers of the cornea which extended, poorly defined, into the normal. The opacity reached beyond the limit of the network of blood vessels and the vision was normal. The fluorescein test was negative. Corneal sensation was normal. Around the mouth and nose were found dried vesicles and others containing a colorless liquid. Slight hoarseness was present. The temperature was 37.2°C.

The factory reported that a bottle containing 10 liters of dimethyl sulphate had been broken in the storage room in the basement. Of those who scrubbed the floor, eight became ill. Our first patient was on the first floor; the other became ill only after cleaning the suit impregnated with the fluid.

In 1934, at the 26th meeting of the Hungarian Ophthalmologic Society, Petres[9] presented a 28-year-old woman who was also injured in the above-mentioned factory. This woman had assisted in the cleaning of the floor, and complained immediately of throat, eye, and tracheal burning. The ocular symptoms increased. A day after the injury, besides the obvious signs of irritation, the picture was completed by subconjunctival hemorrhages and roughening of the cornea. The latter was very obstinate, even a month after the injury a superficial opacity could be seen; complete cure was effected only after three months. The author held the prolonged exposure responsible for the prolonged corneal ailment and its weak regeneration. The lack of latency was very noticeable here, but this was only apparent, that is, the irritation of the conjunctiva appeared more rapidly but the symptoms became graver, and if we calculate the beginning of the injury from this moment, we still note a period of latency. Furthermore, because of the uncertainty of the exact onset of symptoms we cannot disregard the important principle of latency. Raab explains the hypesthesia by

the paralytic effect of dimethyl sulphate on the sensory nerves and the formation of maculae by the effect of the protein-precipitating vapor.

Case 4. A 35-year-old man working in another chemical factory was exposed May 24, 1935, at 10:00 a.m. to approximately 50 gm. of dimethyl sulphate spilled on the floor. As soon as he noticed it, he immediately poured two liters of ammonia on it. At about 1:00 p.m. coryza appeared, at 3:00 p.m. his eyes began to prick, and at 4:00 p.m. a sore throat developed. Symptoms increased and in the meantime a cough appeared. At midnight he complained of extreme lacrimation, nasal discharge, and a rasping feeling in the throat. Our findings on the morning of May 25th were as follows: Both eyes were swollen, and red eyelids with blepharospasm were present. On opening the eye a large amount of hot tears gushed out. The conjunctiva was hyperemic and chemotic. The patient could not be examined with the slitlamp because of the high degree of photophobia. The cornea was slightly opaque and the vision could not be ascertained. Findings on the 27th by the rhinologist were as follows: Nasal skin swollen, mucous membrane slightly congested, right-sided septal deviation, throat congested as well as the epiglottis and vocal cords, and the mucous membrane of the trachea slightly swollen.

Daily application of an alkaline eye cream resulted in a rapid regression of the signs of irritation. On the 30th the patient was discharged with normal vision and a but slightly congested conjunctiva. Zinc-adrenalin drops and protective glasses were prescribed. At a subsequent visit he complained of an easily inflamed eye.

Analysis of cases

In a careful study of the clinical development in these cases, the sign of latency is seen as an important and common characteristic. This coincides with the time of hydrolysis, which takes about six or eight hours, and explains the lack of symptoms found in the first phase of the poisoning. Then the edema of the eyelids and conjunctiva begins, accompanied by lacrimation, photophobia, and blepharospasm. In every case the cornea takes part in the procedure: from a slight roughening to a serious permanent opacity every variation occurs, depending on the intensity and length of exposure. By means of the slitlamp, in a few of my cases, I found a changed limbal picture: the network of the limbus had enlarged and had spread over the periphery of the cornea. At the same place in the deeper layers of the cornea a slight opacity could be found. Parlange[8] found these identical signs among the late results of mustard-gas injury. In the later stages I found no hypo- or anesthesia of the cornea or conjunctiva. The symptoms subside in a few days but the great sensitivity of the conjunctiva remains, so that a stronger light, wind, dust, smoke, and so forth, cause a renewing of lacrimation and congestion which subsides in a few days. On the whole our cases were rather mild and were unaccompanied by more serious symptoms. In spite of this it is well to be careful with the prognosis, just because of the obstinate and recurrent conjunctivitis—the same is true in regard to the respiratory tract.

The similarity of this injury to that from mustard gas is noteworthy. Here also is found a latency (hydrolization to hydrochloric acid) and this gas also attacks mainly moist surfaces. In addition, there is the frequent recurrent irritation of the conjunctiva. The changes in the limbus and anesthesia have been pointed out. Injury of the eye from mustard gas is always more serious because of corneal ulcers, and a characteristic picture develops in the form of varicosities of the conjunctival vessels (Genet), which

clinches the diagnosis in case of a former gas injury. The carmine-red tortuous vessels on a porcelain-white base have given occasion for the name "doll's-eye" ("oeil de poupée"). The cause is probably a lesion of the sympathetic nerves. The paresthetic crescent of the limbus has a like basis; the stagnant blood in the dilated vessels causes bad nutritional conditions and with it a hypesthesia and opacities at the edge of the cornea—mainly above and below. It is possible that like processes exist in the case of dimethyl-sulphate injury because of a lesion of the sympathetic nerves.

Therapy

First aid. Adequate douching, for which purpose 3-percent sodium bicarbonate is recommended; this can be repeated several times. After this the alkaline eye-cream is applied to the fornix and eyelid. If this is not conveniently at hand white petrolatum is substituted.

The composition of the eye-cream is as follows:

	gm.
Sodium biborate	1.0
Sodium bicarbonate (purest) ..	2.0
Distilled water and lanolin aa.	10.0
White petrolatum to make....	100.0

This cream has been satisfactory for all ocular injuries caused by war gases. Its immediate application in the stage of latency is directed against the developing of sulphuric acid. For pain use locally 5-percent novocaine-adrenalin cream or other cocaine substitutes in ointment. Cocaine is contraindicated because of its undesirable effect on the epithelium.

The use of 1-percent rivanol* drops once or twice has been recommended to avert infection where epithelial defects are present. Later symptomatic treatment can be continued in case of corneal lesions; such as dionin and scopolamine. The after treatment is important, for the danger of relapse is very great. To control this the use of sodium-borate–adrenalin drops is recommended, as in injuries due to mustard gas. However, it is most important to avoid irritating atmospheres. The patients must be warned against exposure to tobacco smoke, dust, and strong light. Similar considerations are to be regarded in giving leave from work; namely, calculating the length of sick-leave. In recurrent cases zinc-sulphate and adrenalin drops are given. Protective glasses against glare should be prescribed.

The general treatment of the heart, respiratory tract, and so forth has been indicated in the foregoing discussion.

Summary

The chemical and pharmacologic properties of dimethyl sulphate have been discussed and its toxic action on the experimental animal and on man described. Four cases are presented with analysis of symptoms and methods of treatment.

* An acridine dye.

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RETROBULBAR NEURITIS IN PELLAGRA*

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In the ever-widening ramifications of the problem of the relationship between the vitamins and health, and between the deficiency of vitamins and certain diseases, ocular disturbances have played an important role. Every vitamin deficiency, with the exception perhaps of vitamin E, has at some time been demonstrated to produce an effect upon the eye. Even vitamin E was suspected at one time of exerting a protective influence on vitamin A and thus, indirectly, preventing ophthalmia.[1] In this report the authors wish to call attention to what may be one of the commonest ocular complications of avitaminosis in humans under present social and economic conditions; namely, the association of retrobular neuritis with pellagra. In the recent literature on pellagra (since 1918) only three papers having reference to ocular symptoms were uncovered, although, in the earlier literature, visual disturbances are mentioned quite frequently. The severe pellagra of the Southern States and of Europe in the early part of the century is now encountered rarely. The predominating type of pellagrous syndrome seen today is that associated with chronic alcoholism, although it was pointed out by Du Bois that during the economic depression there was an increase in the number of pellagrins who were not alcoholics.[2] One wonders why the visual symptoms which were apparently so common in the pellagra of the last generation are so infrequent today. Perhaps a multiplicity of vitamin deficiencies were responsible, with consequent exhibition of various ocular derangements.

The earliest report in the English literature on the eye symptoms of pellagra is that of Whaley.[3] He reported upon a group of 35 pellagrins of whom three had optic neuritis, three optic atrophy, and two had retinitis. No examinations of the visual fields were obtained. As a common finding, it was observed that there was a "yellowish reflex" from the retina, "as if the retina were thickened," and that there was dilatation of the retinal veins.

Ridlon[4] in 1916, observed 58 patients with pellagra at the U. S. Marine Hospital in Savannah. Thirty-four percent were said to have "dimness of vision," but complete ocular examinations were not recorded.

The first detailed account of ocular disturbances in pellagra was written by Calhoun[5] in 1918. He summarized the literature on the subject from 1847, practically all from Italy, and reported 10 cases of visual-field changes associated with pellagra. Most of these patients were in the Georgia State Sanitarium for the Insane, part of "several hundred pellagrous inmates." Seven of these patients exhibited a depression of the peripheral fields, with relative or absolute central scotomata. One patient had a relative central scotoma with a normal peripheral field. Two patients had a depression of the peripheral fields with relative paracentral scotomata. In nine of the patients the changes were bilateral. Pallor of the discs was observed in three. In two of the patients who exhibited relative scotomata for colors the visual acuity was 20/15. In the remainder there was decreased acuity corresponding to the changes in the fields.

Cronin[6] reported the case of a chronic alcoholic of 37 years, with duodenitis, polyneuritis, diarrhea, stomatatis psy-

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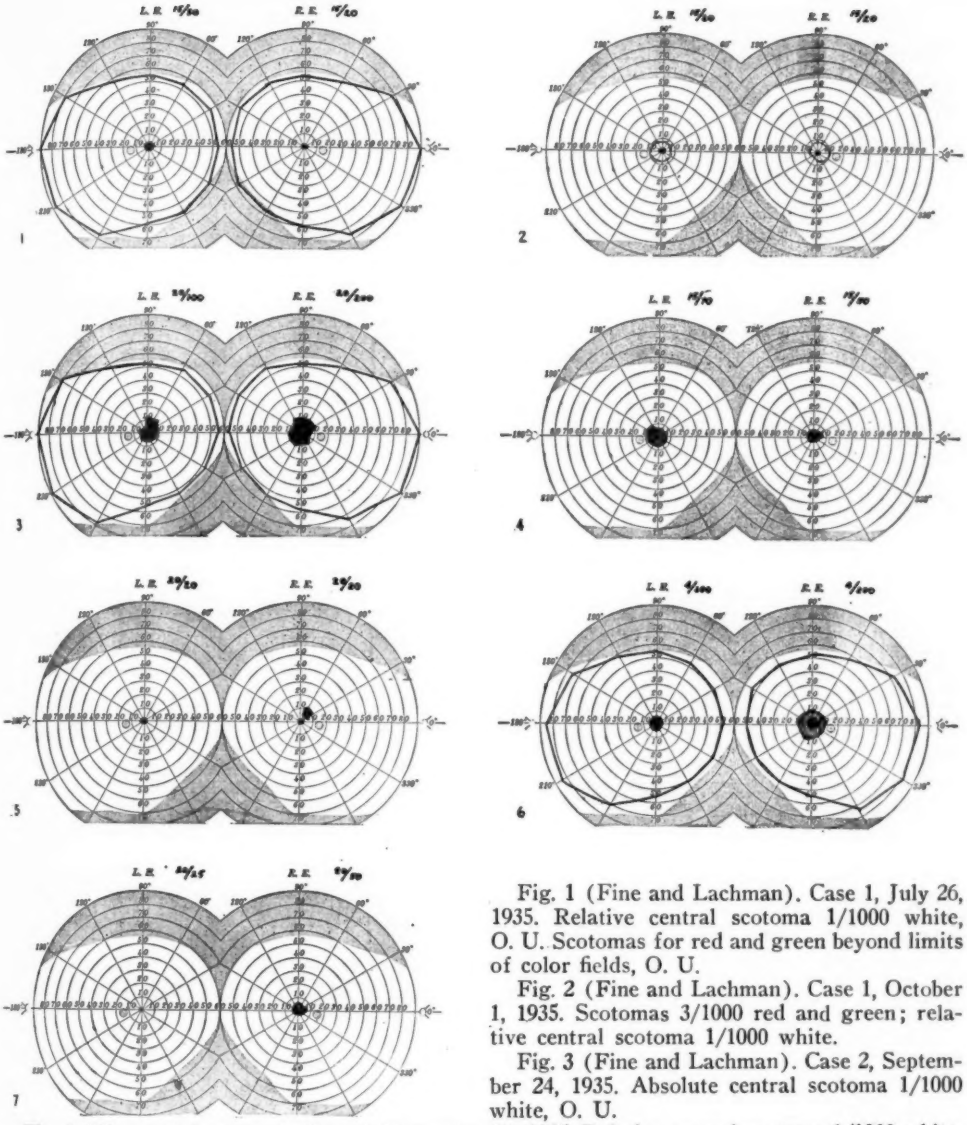

Fig. 1 (Fine and Lachman). Case 1, July 26, 1935. Relative central scotoma 1/1000 white, O. U. Scotomas for red and green beyond limits of color fields, O. U.

Fig. 2 (Fine and Lachman). Case 1, October 1, 1935. Scotomas 3/1000 red and green; relative central scotoma 1/1000 white.

Fig. 3 (Fine and Lachman). Case 2, September 24, 1935. Absolute central scotoma 1/1000 white, O. U.

Fig. 4 (Fine and Lachman). Case 2, November 26, 1935. Relative central scotoma 1/1000 white, O. U.

Fig. 5 (Fine and Lachman). Case 2, January 7, 1936. Relative paracentral scotoma 1/1000 white, O. D. Central scotoma 3/1000 red, 5/1000 green, O. U.

Fig. 6 (Fine and Lachman). Case 3, June 30, 1936. Absolute central scotoma 2/1000 white, O. U. Relative pericentral scotoma, O. D.

Fig. 7 (Fine and Lachman). Case 3, November 24, 1936. Central scotoma 2/1000 red and green, O. D.

chosis, and ocular disturbance. The visual acuity was 20/200, due to a central scotoma in one eye. A macular hemorrhage was seen.

Krylov[7] has recently observed eye disturbances in 36 pellagrins in Russia. These included cataracts, pallor of the optic discs, pupillary changes, involvement of the extraocular muscles, and scotomata for colors.

The review by Levine[8] is the only comprehensive study of the subject and includes an excellent survey of our knowledge of pellagra to date and of the ocular manifestations of vitamin-B deficiency. He records the case of a woman of early middle age, a chronic alcoholic, who presented classical symptoms of pellagra together with an optic neuritis. Both the pellagra and the optic neuritis responded promptly to a well-balanced diet, although the alcoholic intake was not entirely cut off.

The empirical use of vitamin B in the treatment of optic neuritis of unknown etiology has been recommended by Shastid.[9]

Within the past year, the authors have observed three patients suffering from pellagra who had impaired vision due to retrobulbar neuritis. In the first of these the retrobulbar neuritis was diagnosed several weeks before signs of pellagra appeared.

Case 1. Mr. J. K., white, American, aged 33 years, entered the medical ward of Lane Hospital in July, 1935, complaining of sharp pains in the legs of about four months' duration. At the same time there had appeared a scaly eruption over the backs of the hands and forearms which bled easily during washing. Five weeks before entry, the pains in the legs became so severe that he was unable to walk. There was also some mental confusion. A physician at this time observed that "his tongue was red" and that there was albuminuria. The patient entered the local county hospital for one month, during which time the albuminuria disappeared. On leaving the hospital he noticed a numbness of the hands and feet and experienced difficulty in reading and writing. These symptoms brought him to the Stanford University clinic. He gave a history of heavy whiskey drinking (one pint to one quart daily) over a period of three years, with severe neglect of diet. He smoked about a package of cigarettes daily.

Examination: There was a thickened, scaly, pigmented appearance of the dorsa of the hands and both surfaces of the forearms; hyperesthesia of the skin over arms, shoulders, legs, and lower abdomen. The tongue was red. Responses to questions were slow and at times slightly confused. The patient was very irritable and depressed; the blood pressure 140/100. Laboratory examinations: urine, the red and the white blood cell counts, the hemoglobin content, and the stool were normal; the blood Wassermann was negative. There was absence of free HCl in all specimens of histamine test for gastric secretion. Medical diagnoses: Chronic alcoholism; pellagra; peripheral neuritis; achlorhydria; latent glomerulonephritis.

Ophthalmologic examination: Vision was R.E. 15/30, L.E. 15/40; no improvement being obtained with correction of refraction under homatropine; ametropia was R.E. +1.75 D. sph., L.E. ± 1.50 D. sph. The impairment of the reading ability was out of proportion to the visual acuity at a distance. A slight pallor of the temporal halves of the discs was found, and a narrow, grayish, perivascular streak which accompanied some of the retinal arteries to the margins of the discs. The peripheral visual fields were normal. There was a small relative central scotoma for 1/1000 white. Red and green were not identified in any portion of the field.

The patient was given a high caloric, vitamin-rich diet to which were added brewers' yeast, whole liver and iron, and parenteral liver extract (Lederle's, 3 c.c. daily). Improvement was prompt in both the systemic and ocular symptoms. After one week color fields could be obtained and a central scotoma for red and green

was demonstrable. The patient was dismissed one month after entry. One month later the vision was O.U. 15/20, with corresponding improvement in the fields. On last examination in April, 1936, the visual fields were entirely normal, and the visual acuity O.U. 20/15. There remained a slight bitemporal pallor of the discs.

Case 2. Mr. T. G., a white, American farmer, aged 51 years, complained of progressive impairment of vision, which had begun suddenly four weeks previously. There had been occasional aching pains in the legs and a moderately severe diarrhea. For many years a heavy consumer of whiskey, he had during the past few months because of financial worries, increased his drinking, so that he was consuming at least one pint of whiskey daily. He had no appetite for food and had been eating very irregularly and very small quantities. He smoked cigarettes rather moderately, but no cigars nor pipe. A tentative diagnosis of tobacco-alcohol amblyopia was made, and the patient was advised to discontinue drinking and smoking, which he did. Injections of nitroscleran were given. The visual acuity continued to decrease. Two weeks later there appeared a dermatitis on the back of the right hand and several days after that on the back of the left hand. The patient was advised to enter the hospital for further treatment.

Examination: Symmetrical, exfoliative, vesiculating dermatitis extended from the wrists to the metacarpophalangeal joints. Achilles reflexes were not elicited. The vibratory sensation was impaired over the lower legs. Laboratory examination: Both red blood cell and white counts, the hemoglobin content, and the urine were normal, the blood Wassermann and the spinal fluid negative. Van den Bergh's test was negative, direct and indirect. The histamine test indicated gastric hypochlorhydria. There was occult blood in the stool. X-ray films of skull and sinuses were normal. Medical diagnoses were: chronic alcoholism; pellagra with secondarily infected skin; acute proctocolitis.

Ophthalmologic examination: Vision was R.E. 20/200, L.E. 20/100. The margins of both discs were blurred, without appreciable elevation; the retinal veins slightly distended. The temporal half of the right disc was slightly pale. The visual fields showed an absolute central scotoma for 2/1000 white in both eyes. Colors were not recognized in any part of the field except in a small area in the lower temporal portion of each field where a 15-mm. red object was identified hesitantly.

The patient received a high caloric, vitamin-rich diet, with the addition of brewers' yeast, cod-liver oil, whole liver and iron by mouth, and daily injections of 6 c.c. of Lederle's liver extract; diarhea was controlled with bismuth and opium. He was dismissed after one month with instructions to continue the same regime. During this period he was allowed several cigarettes daily. After leaving the hospital he said that he drank occasionally and smoked a few cigarettes each day.

Two weeks after hospitalization, the field for red 15/1000 began to increase and a central scotoma for red could be outlined, in addition to the relative scotoma for white. There was no further change until three months later (November, 1935) when the scotomata appeared smaller, and the visual acuity had improved to R.E. 15/70, L.E. 15/50. In January, 1936, only a very small central scotoma remained for red and green, together with a small relative paracentral scotoma for white in the right eye. Vision was O.U. 20/20. Fundus examination showed the disc margins to be no longer blurred; there was, however, a slight

pallor of the temporal border of the right disc.

Case 3. Mr. G. B., a white photographer, aged 38 years, was seen June 29, 1936, with a complaint of having had impaired vision and sharp pains in the legs for a period of several weeks. For the preceding few months he had been drinking 2-3 pints of whiskey daily; he smoked frequently, but only cigarettes.

Examination: The dorsa of the hands and the back of the neck presented a brown, thickened, scaly appearance with edema and desquamation. Blood and urine examinations were negative; the blood Wassermann test negative. X-ray films of the sinuses were normal. The medical diagnoses were: Pellagra; peripheral neuritis; chronic alcoholism.

Ophthalmologic examination: Vision was O.U. 4/200, with no improvement with correction of refraction. There was a slight dilatation of the retinal veins in the right eye, but the disc was normal in color and demarcation. There was an absolute scotoma for 2/100 white, and a large scotoma for red and green, extending to the 10-degree arc in the right eye. There was an absolute central scotoma for 2/1000 white in the left eye.

Alcohol and tobacco were proscribed. The patient was placed on a vitamin-rich diet with accessory vitamin-B products, cod-liver oil, and dilute hydrochloric acid.

On July 9, 1936, the visual acuity had increased to 20/200 O.U., and the relative scotoma in the right eye could no longer be found, although the central scotomata for 2/1000 remained unchanged. One week later vision in the left eye had improved to 20/70. At this time a slight pallor of the temporal side of the right disc was observed. The central scotomata were smaller. In November, 1936, the vision was O.D. 20/50, O.S. 20/25. There was no further change in the fundus.

It is to be noted, in the cases here reported, that none of the three patients exhibited the cecocentral scotomata which have been said to be characteristic of tobacco-alcohol amblyopia, although repeated attempts were made to find them. Only one of these patients was what is ordinarily regarded as a heavy smoker but none used tobacco in any form other than cigarettes. It is a matter of clinical record that tobacco-alcohol amblyopia is quite rare in cigarette smokers. Two of our patients were allowed two or three cigarettes daily while under treatment. In the first patient, the optic-nerve involvement appeared after a month of abstinence from alcohol, during which time the patient was in a hospital under close observation. In the second case, the visual disturbance reached its height after the patient had abstained from alcohol for three weeks, during which time he was being treated with injections of nitroscleran, under a tentative diagnosis of tobacco-alcohol amblyopia. This patient also drank occasionally after leaving the hospital. Although slight changes in the discs were observed early in two of our patients, they were never sufficiently marked to be classified as papillitis.

In each case the presence of skin lesions led to the correct diagnosis. Pellagra involves chiefly the skin, the alimentary tract, and the nervous system. The disease may manifest itself in only one or in all three of these systems, and that fact alone has cast doubt on the unity of vitamin B. The syndrome of pellagra sine pellagra, for example, has often been described. The symmetry of the skin lesions has led Vedder[10] to suggest that it is due to changes in the spinal cord and really a part of the nervous manifestations of the disease. If this is true, and there is much evidence that the skin lesions are of a trophic type, the correlation of these lesions with the psychic changes, and the

involvement of the optic nerve becomes much simpler; for one might assume the deficiency of a single factor, included in the vitamin-B complex, resulting in injury to the central nervous system. The frequency of mental and emotional disturbances among the patients with ocular involvement, reported by Whaley, Calhoun, Cronin, and Levine, and found in one of our patients, may be more than a coincidence, although the total number is too small to allow of a statistical comparison.

With the present state of our knowledge of pellagra, we can only speculate about the relationship of the pellagrous syndrome to the visual disturbances herein recorded. In the first place, the etiology of the disease is still unsettled. Since vitamin B_2, or G, was separated from the antineuritic factor B_1, it has become more and more apparent that even G is a complex of various factors the number and nature of which are not at all understood. It has been suggested that vitamin G is composed of at least two factors: "one the deficiency of which produces pellagralike symptoms in the rat, and another the deficiency of which produces a decline in growth." This suggestion followed the observation by Sure[11] and his co-workers, "that there was no correlation in rats between failure in growth and in the incidence of pellagralike symptoms." Underhill has summarized the situation well: " . . . at the present stage of knowledge one may accept the view that, although vitamin-G deficiency is closely related to pellagra, some caution must be exercised in relying on this vitamin deficiency as being entirely responsible for the etiology of the disease. This caution is especially pertinent when preventive or curative measures are to be advocated."

When one tries to tie in the factor of alcohol, further difficulties are encountered. "Alcoholic pellagra" is now a well-recognized syndrome, and it is generally accepted that the consumption of alcohol is only indirectly related to the symptoms which appear. The history in these people is usually that of chronic alcoholism over many years with the appearance of pellagralike symptoms after a spree lasting several weeks, during which only one type of food has been eaten. It has been suggested that the important factor in these cases is undernutrition and damage to the alimentary tract from the alcohol, interfering with absorption. The severe enteritis that may occur in pellagra has been described often, and it initiates a vicious cycle through further interference with nutrition.

In considering the ocular disturbance associated with pellagra, the problem of the role of alcohol becomes more significant in view of the relative frequency of so-called tobacco-alcohol amblyopia. The association of tobacco with ethyl alcohol in producing injury to the visual fibers is a constant one. Chronic alcoholism in itself is not often recognized as a cause of amblyopia, although it has been said to occur together with peripheral neuritis. There has been an increasing tendency to regard alcohol as an exciting factor in tobacco amblyopia. Recently the role of chronic alcoholism in peripheral neuritis has been questioned. Strauss[12] has demonstrated that the peripheral neuritis associated with alcoholism is not the result of a neurotoxic action of alcohol, but is the result of a deficiency of vitamin B in the diets of some alcoholics, and that the symptoms of polyneuritis will disappear when the deficiency is supplied, even though alcohol is being used freely. Jolliffe and his co-workers[13] have calculated the quantitative intake of vitamin B, of alcoholics with and without neuritic symptoms and have shown that in every instance in which polyneuritis was pres-

ent the vitamin intake was below the calculated requirement, and vice versa. This requirement appears to be in constant ratio to the caloric intake and the body weight.[14] It does not seem improbable that a relationship such as exists between vitamin-B_1 deficiency and the peripheral nervous system may also exist between vitamin-B_2 (G) deficiency and the central nervous system, of which the optic nerve is a part, and that in each case the alcoholism plays only an indirect role. Such a quantitative relationship would offer an explanation of the fact that some severe alcoholics never suffer from amblyopia, while other relatively moderate drinkers suffer serious insult to the visual fibers.

One wonders, also, whether many cases of "alcohol and tobacco" amblyopia are not complicated by a deficiency of vitamin G.

Since the preparation of this paper, there has appeared in the Archives of Ophthalmology an excellent report by Carroll[15] of 10 cases of pellagra or polyneuritis with amblyopia very similar to those which we have described above. Undoubtedly many other oculists have observed such patients but have neglected to report them in the past.

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SURGERY OF THE LEPROUS EYE

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The earliest account of the disease now known as leprosy dates back to 1300 B.C., when it was supposed to have occurred among negro slaves in Egypt. It became known to Greece in the period around 500 B.C., after the conquest of Europe by people of Asia and Africa. About 1000 A.D. other countries of Europe were discovering the disease in increasing numbers and it then became known to practically all European countries.

As early as 800 A.D. England discovered its presence, and shortly thereafter Norway, Greenland, Sweden, and parts of the Russian sea border were known to have recognized its existence. Leprosy was most prevalent between the 12th and 14th centuries, after which it began to decline, especially in England where early in the discovery of the disease careful restrictions were enforced.

Modern living conditions, with sanitation, good housing, improvement of nutrition, plus early and enforced segregation, play an important role in reducing the occurrence of this disease. Enforced segregation is generally accepted as one of the greatest factors in preventing the spread of leprosy.

Rogers and Muir tell us the disease first appeared in the United States about 1750, in Louisiana, about which time it appeared also in Canada.

In Hawaii, leprosy was known about 1850, although the exact time of its introduction has not been definitely ascertained. It was probably introduced by Chinese laborers, the reason for this belief resting on the fact that the first name by which the disease was known in Hawaii was "Mai Pake," meaning "Chinese disease."

Although leprosy has now become a comparatively rare disease in Europe and the mainland of the United States, it is still attacking great numbers of people in other parts of the world—in India alone the number is estimated at more than a million and a half. Hence the fight against leprosy is still a problem of great importance, and all information that can further the prevention, treatment, and, last but not least, the early diagnosis of the disease, is not of academic interest only, but has also a great deal of practical value.

In presenting this subject for your consideration, it is hoped that my 14 years of service to Kalihi Hospital, Kalaupapa Settlement, and service to the Board of Health and the Board of Hospitals and Settlement may be condensed and passed on to you in a helpful form, so that you may gain by my many bitter lessons and painful experiences.

In 1929 I reported my observations on the subject before the First Pan-Pacific Surgical Conference. In the main my opinion since that time has not changed, except in certain particulars important enough to record here.

GENERAL SURGICAL CONSIDERATIONS

Leprosy of the eye may be likened to tuberculosis of the eye, so far as pathology and the general nature of the disease are concerned. It is very rare that ocular leprosy is the first manifestation of the disease, and we know how little can be accomplished by surgery of ocular tubercular processes.

Leprosy, unlike tuberculosis, never shows a deep localization in the eyeball, in the optic nerve, retina, and so on, and never shows alterations in tissues other than those which embryologically repre-

sent in the eye the cutaneous integuments.*

We must be content to relieve pain and discomfort and to preserve priceless vision so long as it is within our power. Two or three leprous conditions of the eye or adnexa can be markedly relieved, a few conditions temporarily relieved, and many not at all. Our object has been to try to prevent inevitable loss of vision by correcting lagophthalmos, destroying superficial pannuslike blood vessels of the cornea, and to attempt improvement of sight by removal of opacities, making artificial pupils in corneal disease or in occlusio pupillae. When these undertakings have been accomplished, our work is done, and when we consider that 80 percent of all leprous patients and 90 percent of all nodular leprous patients have ocular leprosy, it would seem that there is much to be done. The principal leprosaria statistics* show that nodular leprosy attacks:

1. In the first to the fifth year of the disease, ocular adnexa 50 percent.
2. In the fifth to the tenth year, adnexa 95 percent, eyeball 50 percent.
3. In the second decade it is difficult to find a leper without ocular manifestations.

Surgery of the lids

By far the most common complication of leprosy of the eye is that of orbicular paralysis with atrophy of the muscle, ectropion, and the consequent corneal exposure and erosion. This is one condition for which we can do the greatest amount of good by lid operations. I have performed more than 200 external-lid operations, all in cases of orbicular paralysis. These were all advanced cases—cases in which the lid was sagging from complete paralysis, of extreme degree of ectropion with epiphora, of maceration of the skin of the face and lower lid from tearing; and in most cases some degree of keratitis from exposure was already present.

In my earlier work I followed the work of Fuchs, using his operation as he taught it. As time went on it was found that some modification was necessary in order to accomplish a more complete result, for this procedure, so admirably fitted for other lagophthalmos cases, did not seem so well adapted to the leprous eye. The flaccidity and orbicular paralysis and atrophy seem more extreme in leprosy than in other paralytic orbicular conditions. Consequently, in 1929, I reported my modifications of Fuchs's technique, which consisted in resecting more of the upper-lid cutaneous tissue and extending it temporalward, thus lifting the lower lid and putting it more on the stretch by anchoring it to the less movable parts nearer the orbital margin. The free cartilage of the lower lid must necessarily slip under the upper lid to a greater distance, and with no apparent ill effects. By such a procedure the external canthus was closed to a marked degree.

In 1934 I modified the technique yet further and am now using this technique exclusively in all cases, finding it eminently satisfactory in my hands. It consists, briefly, in splitting the gray line (intermarginal line just posterior to the eyelashes) with a keratome in its outer extremity for such a distance as the amount of correction indicates (usually 1½ cm. is sufficient). The splitting begins at the outer canthus, extending inward (see A-E, fig. 1). Then, with a sharp scalpel, the outer canthus being the starting point, an incision is carried upward and outward through the skin, following slightly more upward the natural line of the lower lid curve (A-B, fig. 1). This incision is extended also as far outward and upward as the severity of the deformity indicates (usually 1½ cm.). Now, depending on

* Calderaro Clin. Oculo., Palermo, 1909, pp. 3437-3490.

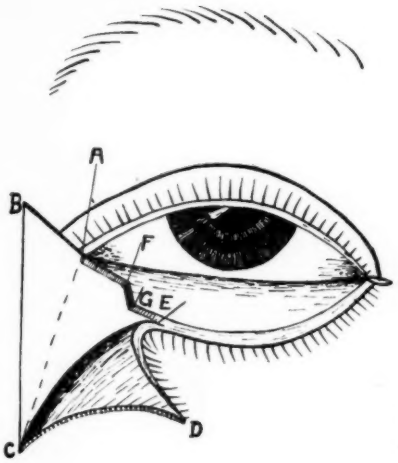

Fig. 1 (Pinkerton). Incisions and dissection.

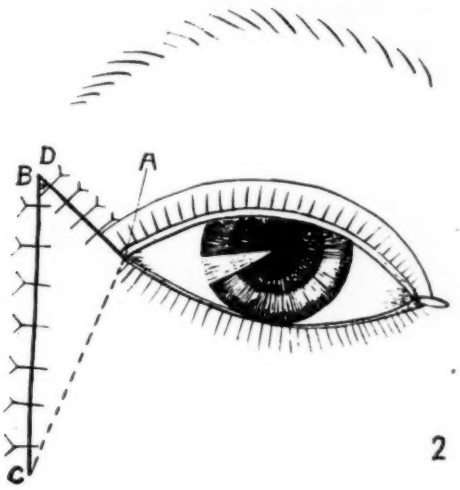

Fig. 2 (Pinkerton). Sutures.

the amount of flaccidity of the lower lid and the folds and wrinkles of the face, an incision is carried downward on the side of the face (B-C, fig. 1) for three or four centimeters, beginning at B of the A-B skin incision. Then the lower end of this incision is joined at C (fig. 1) by another incision back upward to the external canthus (A-C, fig. 1). This triangular skin section (A-B-C, fig. 1) is dissected free and discarded. The skin (A-C-E, fig. 1) medialward of the now denuded area, is dissected free for a distance of 1½ cm., making a flap (C-D-E, fig. 1) of the tissue forming the outer portion of the lower lid. A triangular section of the tarsal plate and conjunctiva is now removed by sharp scissors (A-F-G, fig. 1), the size and amount depending on the amount of correction desired (usually 1 cm. of tarsus is sufficient), the base of the excised area being up. Now the entire flap and lower eyelid are transferred to the denuded area and sutured (D is transferred to B, and E to A, figure 2, and sutured as illustrated in figure 2). The lower lashes that occupy the new position and seem to extend or lengthen the lower eyelash line fall out or become so thin and infrequent that they cause no cosmetic annoyance. The new procedure has served so well in my hands that it is now used in all my lid plastic work.

In the event that future atony and atrophy occur, sufficient to cause recurrence of the lagophthalmos, the operation may be repeated.

In my earlier writings I stated that about 25 percent of the cases requiring tarsorrhaphy are not sufficiently protected by the external operation alone and also require an internal tarsorrhaphy. Since employing the modified technique of the external operation I now find it unusual indeed that the internal procedure becomes necessary. My technique for the internal operation is, briefly, a modified Fuchs technique accomplished by incising a small area of the skin over the upper punctum and a similar area below the lower punctum and suturing these denuded flaps together, producing a slight inversion of the lids in this area. The puncta are thus brought into close proximity to each other and lie behind the sutured area of the lids and carry on their normal function. Only the most delicate adhesion between the lids is necessary,

and when healed this union is almost transparent because of its delicate nature and the downward traction of the lower lid.

Surgery of the lacrimal gland

Not infrequently, in long-standing cases of orbicular paralysis, the patients complain of excessive tearing and epiphora, and it is found on examination that the lacrimal gland and its accessory portion are enormously hypertrophied. In such cases, if it is probable that a tarsorrhaphy will not correct or control the excessive lacrimation, a portion of the accessory gland is excised after the technique of De Wecker, and the lid operation is then undertaken.

Other involvements in ocular leprosy

The lacrimal sac and duct: The lacrimal sac does not seem to be especially vulnerable to leprosy in itself, but does naturally fail to function normally in the flaccid lid condition of orbicular paralysis. Theoretically one would expect the stasis of tears and drainage débris to incite lacrimal-sac inflammation. Also most leprous patients have leprous nasal lesions, hence infections of the sac, logically, should be more frequent. However, in actual practice dacryocystitis does not seem to be much more common than it is among nonleprous people of a similar level.

I have performed the operation of dacryocystectomy but three times in leprous patients following the usual technique of excision. Otherwise, results from irrigation and hygiene alone have been satisfactory. The lacrimal sac responds to nasal hygiene and shrinking in many cases.

The tarsus and conjunctiva: I have found no pathology of the tarsus that is directly due to leprosy. In deep nodules of the lids it not infrequently occurs that the tarsus is partially absorbed, but no surgery is specifically indicated. Cicatricial changes that are found are due to trachoma, which not infrequently occurs in a leprous patient. Tarsectomy, in such cases, must be performed if indicated, preferably by using the technique of leaving 2 mm. along the edge or lid margin. Entropion has not occurred when the sutures have been placed far back of the incised area, leaving a wide ledge of conjunctiva.

Practically all leprous lesions of the eye are associated with numerous corneal opacities. Close study of these opacities shows them to contain a network of blood vessels, many superficial, which find their way to the corneal location via the conjunctiva through the limbus (Pannus leprae). When superficially located, good results are obtained by the operation of peridectomy, which was formerly done by excising 2 mm. of conjunctiva entirely around the cornea or where it was indicated. Later I have used the actual cautery and electrocoagulation. These latter methods seem best, since each blood-vessel trunk can be taken separately without excising other healthy tissue.

Pinguecular masses are fairly common in leprosy—so are pterygia. Simple excision of the pinguecula and either excision or the McReynolds burying operation for the pterygium is done. There is so much to be done for the patient otherwise, that I never operate upon either a pterygium or pinguecula unless these are causing some trouble or are rapidly growing to the point of visual disturbance. In rare instances they may be complicated by nodular infiltration (ophthalmia phlyctenulosis lepra) in which case they must be either removed or coagulated with the electric current.

Nodules on the globe. Leprous nodules frequently occur in the episcleral and sub-

conjunctival tissues. The site of predilection seems to be near the limbus, usually on the temporal side, but they may appear at any point around the limbus. When these nodules are superficial and are known not to involve the deep sclera, they were formerly dissected free and excised. More recently the electrocoagulation needle has been used with excellent results.

In earlier experiments carbon dioxide was used but it was painful and tedious, requiring several exposures. The deeper and more firmly fixed nodules respond better to coagulation, although it is known that whatever treatment is used is apt to be palliative only. These deeper nodules spring from the ciliary body and force their way to the surface through sclerae weakened by pressure, absorption, and by tiny leprous nodules following the anterior ciliary blood-vessel openings. I have found no extraocular-muscle lesions peculiar to leprosy, the few cases I have seen having been due to other causes.

Cornea: I have found no condition of the cornea due to leprosy that requires or responds to surgery with the exception of conjunctival flaps to cover a large ulcerative area of the cornea that would otherwise not heal by itself. These corneal nutritional disturbances seem to heal very nicely when covered by conjunctiva. Most such lesions seem to involve the lower sector, for this area is so often exposed and infected. We frequently see lepromatous granulomas of the cornea as an end result of ocular leprosy. An eye with such an involvement should be enucleated, but in the event that enucleation is not permitted, we often dissect the mass free from the cornea; the eyeball then shrinks and becomes atrophic. Enucleation technique is no different in this disease than in others. In the many enucleations that I have performed, troublesome bleeding has been a rarity.

The iris: Iritis is a routine finding in leprosy. Long before nodules of the limbus are seen, the patient may have many attacks of iritis and much exudation takes place. Iris bombé is then frequently seen. Surgically, the usual technique of transfixation is not successful, because of the frequently recurring attacks closing the new openings by exudation.

I have found from experience that a wide iridectomy is much more satisfactory and lasting. The area that seems free and least degenerated is selected for iridectomy, no matter where it may be located. We must also consider the cornea and perform the optical iridectomy opposite the clearest part of the cornea, for it is often opaque in large sectors. Optical iridectomy is often unsatisfactory because of the great friability of the iris, which tears easily and often defeats our best efforts in forming a large pupil.

Glaucoma: In theory we would expect to see many more glaucomas than is actually the case. In 14 years of experience with leprosy I have seen but three cases of glaucoma in useful or salvageable eyes requiring surgery. In one case I performed a corneoscleral trephining and in two others a cyclodialysis. All three were ultimately failures because of the continuation of the leprous process.

Cataract: Secondary cataract is common in leprosy, but this usually occurs late in the process and no surgery can be done. True senile cataracts are not common, for the average patient does not live so long as the nonleprous individual.

I have performed cataract extractions on eight different leprous patients, with results comparable to those in an average of eight similar nonleprous patients. All of these patients were free of ocular leprosy at the time of operation, five representing the older, "burned-out" nerve type of case, who had been so fortunate as to escape ocular leprosy.

SURGICAL NOTES

Armamentarium: The instruments best adapted for this special work are those commonly used by ophthalmic surgeons in their routine practice—a portable electrocoagulating unit, an electric cautery with a fine point, black silk, and good needles completing the outfit.

Anesthesia: In earlier work I depended upon cocaine instillations in the conjunctival sac. It was found unsatisfactory because of several factors.

1. Most lid and conjunctival lesions were associated with excessive tearing. This seemed to dilute the cocaine solution.

2. Sagging of the lower lid, permitting too rapid escape of the fluid.

3. Poor absorption due to altered condition of the blood vessels. For all operations in the past 10 years I have depended entirely and exclusively upon 1- or 2-percent novacaine by infiltration and block anesthesia.

Postoperative infection: In spite of poor aseptic technique due to poor working conditions, in our earlier pioneer work, there was not a single case of postoperative infection. An accepted explanation is that a leprous eye seems to be peculiarly immune to the usual infectious organisms.

THE SOUTER TONOMETER

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The Schiötz tonometer, now generally regarded as the standard clinical instrument for measuring intraocular pressure, first raises this pressure by the weight of the instrument and then mechanically registers on a scale the depth the weighted plunger depresses the cornea. The important factors involved in the determination are the size, curvature, and elasticity of the cornea, the size and elasticity of the eye, the size of the footplate of the instrument, the curvature of the latter, the total weight applied to the eye, the amount of fluid forced from the eye by this weight, and finally the actual intraocular pressure existing before the application of the instrument.

Apart from the actual intraocular pressure, the other factors having to do with the eye itself are so different in different eyes and so variable in the same eye under different conditions that the results obtained with this instrument are very unreliable. Not only are they unreliable as regards the determination of the actual intraocular pressure but also as regards the determination of differences of intraocular pressure in the same eye at different times. That is to say, while the instrument may show that the pressure in an eye has become increased or decreased, it cannot be relied upon to show the amount of change in pressure.

The McLean tonometer, which uses one weight for the determination of all intraocular pressures, is obviously less dependable than the Schiötz.

In 1916 Souter* devised a simple tonometer in the use of which all variables pertaining to the eye, other than the actual intraocular pressure, become relatively unimportant. They are certainly negligible when compared with the importance of the variables obtaining in the use of the Schiötz tonometer. Souter's instrument (fig. 1) consists of a tubular body containing a freely movable plunger connected with a helical spring. It con-

* Souter, William N. A simple tonometer for clinical use. Ophth. Rec., 1916, v. 25, p. 80.

tains fewer parts and is smaller and more portable than any other tonometer. The whole instrument is about the size and weight of an ordinary fountain pen. When in use, the instrument is held horizontally in the hand of the examiner, and the amount of pressure applied to the cornea by the tip of the plunger is only that derived from the helical spring. Pressure sufficient to produce only the slightest definitely recognizable indentation of the cornea is applied. The indentation is so slight that it can be recognized only optically. It appears to be greater than it actually is. After many attempts I have failed to measure it mechanically. A mechanism such as is used in the Schiötz tonometer would be entirely inadequate for the purpose. Obviously, such a slight indentation would raise the intraocular pressure a negligible amount.

The pressure at the end of the plunger required to produce the slight indentation is obviously dependent chiefly upon the intraocular pressure. It is only to a slight extent dependent upon the resistance of the cornea; still less dependent upon the size of the eye, the elasticity of the eye as a whole, or the curvature of the cornea. Hence wide variations in each of these factors affect the results obtained with this tonometer but slightly. Only when the cornea is badly scarred or edematous, or when the anterior chamber is obliterated as a result of inflammatory conditions, are the readings difficult to interpret.

The Souter tonometer, however, as compared with the Schiötz has one disadvantage which no doubt accounts for the fact that it has not come into general use.* This disadvantage resides in the difficulty of determining the amount of indentation of the cornea at which the instrument is to be read. Ability to make correct readings requires considerable practice, but when once this ability is acquired there is less difficulty in making readings with this instrument than with the Schiötz tonometer. Souter generally employed artificial light, but I have found this unsatisfactory. He viewed the cornea from the side, so as to obtain a profile

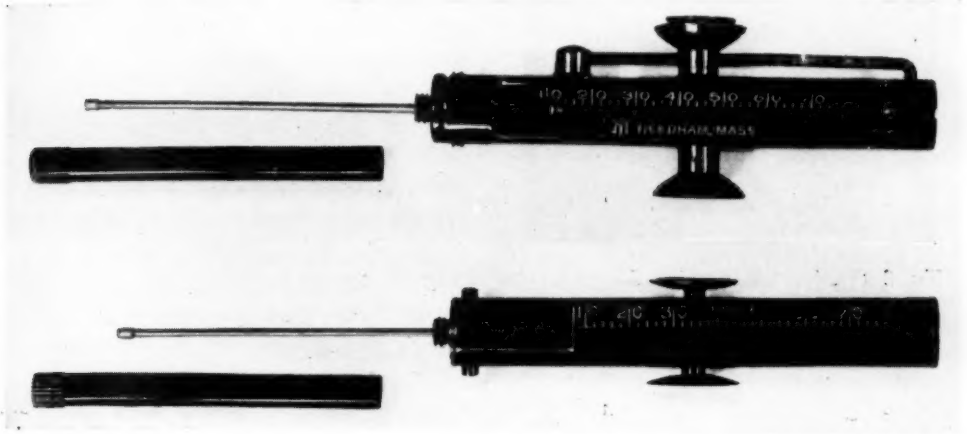

Fig. 1 (Verhoeff). The new model of the Souter tonometer now obtainable, with beveled scale and new type of stop, is shown above, the original Souter tonometer below.

* The manufacture of this instrument was abandoned by its original makers several years ago. Recently, through the efforts of Dr. James J. Regan of Boston, it is again being manufactured by Mr. Roland A. Matthies of Needham, Mass., and may be obtained from C. A. L. Langton, Optician, 419 Boyleston Street, Boston.

view of the apex, a procedure which I have also found unsatisfactory, not only because it does not permit sufficiently precise readings but because it requires that the instrument be held in the left hand when the left eye is tested. With artificial light an appearance of a narrow,

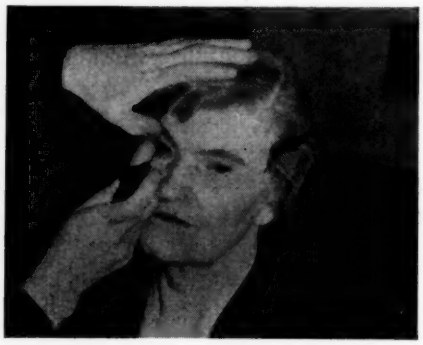

Fig. 2 (Verhoeff). Showing Souter tonometer applied to the cornea. The instrument is held horizontally with reference to the ground and perpendicular to the apex of the cornea.

bright ring on the cornea surrounding the tip of the plunger is produced, and judgment must be based chiefly on the size of this ring.

I have found that the best light is that obtained from a window with a large sky exposure. The patient is seated about five feet from the window. The instrument is held in the examiner's right hand, horizontal with reference to the ground, and applied perpendicular to the apex of the cornea (fig. 2). The examiner uses both eyes, and stands about 33 cm. from the patient, with his right eye (with reference to the examiner) slightly to the left of the instrument and about on a level with the latter. It is important that the patient look straight ahead so that to the examiner an image of the window appears in the center of the cornea. As the tip of the instrument is first pressed against the cornea, a slight disturbance in the corneal reflex will be observed, due to compression of the epithelium. This should be ignored. Then a shallow cupping will be seen. The pressure should be continued until the cup suddenly becomes deeper without becoming appreciably wider, as if the cornea has given away. The scale is then read. The accuracy of any given reading is always indicated by the range needed to make the cup suddenly appear to give way and come back. A change in reading of 5 percent in either direction is easily recognized. The apparent width of the cup when it suddenly becames deeper also indicates the height of the intraocular pressure—the narrower the cup, the higher the pressure. With practice, a fairly accurate estimate of the intraocular pressure based on the relation of the apparent width to the apparent depth of the cup can be made, and may be used as a check upon the reading based on the sudden giving way of the cornea.

Just what method Dr. Souter used in calibrating his tonometer I do not recall, but he did not use a manometer for the purpose. Before the instrument was put on the market he brought it to me in the Pathological Laboratory of the Massachusetts Eye and Ear Infirmary with the request that I check his calibration. For this purpose I employed the eyes of rabbits and cats, and at least one freshly enucleated normal human eye. By means of a cannula inserted in the eye, various intraocular pressures were produced and measured by a water manometer. These pressures were compared with readings of the Souter tonometer. I found that his calibration was substantially correct. Unfortunately, I did not preserve the data obtained at that time, and therefore cannot say just how correct his calibration was. At that time, neither of us fully realized that his tonometer was really more precise than that of Schiötz. He considered it to be equally accurate and much more practical. We, therefore, re-

garded the calibrations at which he had arrived as sufficiently accurate for all practical purposes. This is, no doubt, still true; yet in view of the possibilities of the instrument, the calibration should again be checked. It might be thought that the helical spring in the Souter tonometer would change considerably with time. As a matter of fact, a recent check of the instrument I have used daily for 20 years with new and unused Souter tonometers showed no appreciable change. It is now my belief that the instrument gives a more accurate indication of the actual intraocular pressure in the living eye than is usually obtained even by laboratory methods; for the latter involve the insertion of a cannula in the eye, and this procedure of itself may change the intraocular pressure. In an enclosure as small as that of the eye, even a slight change in the fluid content has a relatively marked effect on the pressure.

Since one of the first Souter tonometers was presented to me by Dr. Souter over 20 years ago, I have relied on no other tonometer. I have, however, frequently had opportunity to compare its readings with others made in the clinic with the Schiötz tonometer. When these have been at variance, as they often have been, I have regarded those made with the Schiötz as incorrect. As a result of my long experience in the use of the Souter tonometer, I have concluded that an intraocular pressure recorded by this instrument as over 20 mm. of mercury, is always pathological and dangerous to the integrity of the eye. If the pressure cannot be maintained below this by means of medication, I always operate upon the eye unless the patient is willing to run the risk of loss of visual function, or if no useful vision remains. While, no doubt, there are eyes which can withstand this pressure, they are too few in number to be given any consideration in regard to the question of operation. As a matter of fact, I seldom encounter an eye in which a pressure of more than 20 mm. (Souter) is maintained that does not show some excavation of the optic disc or loss of visual field.

In addition to its greater accuracy, the Souter tonometer has two important advantages over the Schiötz tonometer. First, it is less dangerous to use. I have never seen a cornea abraded by its use, whereas I have frequently seen an abrasion result from the application of the Schiötz tonometer. In a recent case observed by me, a corneal ulcer resulting in a central scar and marked impairment of vision followed the use of the latter instrument. Second, the Souter tonometer is less objectionable to the patient. Within one minute after the instillation of a solution of 0.5-percent Pontocaine, the tonometer can be applied while the patient is in a sitting position, and without the slightest discomfort to him. These advantages are especially evident in cases in which it is desired to determine the intraocular pressure soon after operation. To obtain accurate readings with the patient in a reclining position, it would be necessary to make allowance for the weight of the plunger. This I have never done.

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A NOTE ON DIASTOLIC PRESSURE AND GLAUCOMA

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There is nothing new in the relation between retinal arterial blood pressure and intraocular tension and their combined effect on retinal circulation. There may be, however, a new idea or a revived idea that this relationship should indicate part of the treatment for certain cases of glaucoma.

The monograph in the October, 1936, issue of the Archives of Ophthalmology on the "Treatment of atrophy of the optic nerve," by H. Lauber[1] of Warsaw, Poland, is very instructive regarding a contributing cause of optic atrophy in tabes and suggests a line of argument regarding the relationship between arterial diastolic blood pressure and glaucoma.

It is common knowledge that some patients have glaucoma without increased intraocular tension and that some patients have increased intraocular tension without any other signs of glaucoma. Also, some of these former cases continue to develop a concentric contraction of the field of vision while the intraocular tension remains well below the upper limits of normal. The type of field contraction in these cases—namely, concentric and not confined to the nasal field—is characteristic of a circulatory optic atrophy and is not typical of glaucoma. That is, the atrophy in these cases is progressing faster than the glaucoma, and the cause of the atrophy should be treated as well as the glaucoma.

According to Lauber, the vascular tension in the retina of tabetic patients who have optic atrophy shows a low arterial pressure, especially the diastolic pressure. When the normal relation between intraocular tension and arterial pressure is diminished there is a disturbance of the capillary circulation of the retina. Since the vascular pressure is less at the periphery of the retina than centrally, the outer parts of the field are affected first and a concentric contraction of the field of vision results. This picture is equally true in glaucomatous patients with low diastolic pressure.

Lauber's cases are discussed on the basis of retinal arterial pressure, which for most of us is unsatisfactory or difficult to measure, particularly in the presence of miosis. For practical purposes and according to Sobanski[2] we can use the general peripheral blood pressure as our guide, and I would consider the normal peripheral arterial diastolic pressure as from 70-100 mm. of mercury.

Hence, the lower normal peripheral arterial diastolic pressure of 70 is 44 mm. above the higher level of normal intraocular tension of 26 mm. of mercury. This difference should be maintained to preserve a normal retinal blood supply. As stated above, a reduction in this difference by either a higher intraocular tension or a lower arterial diastolic pressure results in an insufficient retinal blood supply and may be followed by an optic atrophy, as shown by concentric contraction of the field of vision.

Lauber states that cases of tabetic optic atrophy associated with low arterial diastolic pressure should be treated by increasing the diastolic pressure. So, also, these cases of glaucoma which present an increasing concentric contraction of the field of vision as the principal symptom and which are associated with low arterial diastolic pressure should be treated by increasing the diastolic pressure while also treating the glaucoma, because the glaucoma is not dominating and is not the cause of this type of field contraction.

At the opposite end of the argument a

high arterial diastolic pressure maintains a good retinal circulation in spite of a high intraocular tension. These are the cases that may show little or no sign of glaucoma other than the increase in intraocular tension. Unless controlled by miotics or operation the resulting destruction is due to the glaucoma and not to the circulation. Furthermore, in these cases a reduction in the arterial diastolic pressure[1, 3] would hasten the process because of the lowered relation between arterial diastolic pressure and intraocular tension, the difference between which should be kept up to a minimum of 44 mm. of mercury.

This idea is substantiated by the observations of Sobanski[3] who states that intraocular tension scarcely influences venous retinal pressure but exerts a marked effect on arterial retinal pressure. He concurs with Lauber's statement that the optic atrophy of tabes increases when the differences between arterial diastolic retinal pressure and intraocular tension is too low.

Sobanski further maintains that a variation of 8-10 mm. of mercury in intraocular tension has a serious effect on retinal circulation, and that an increase in intraocular tension compresses the vessels, thereby upsetting the metabolism of the nerve fibers.

He also calls attention to the type of glaucoma in which there is normal intraocular tension, which for these patients is too high, for they have a low arterial diastolic blood pressure. He warns against reducing the blood pressure in glaucoma patients with high diastolic pressure because it protects the eye from the glaucomatous process.

A review of our case records by each of us would reveal a number of both of these types of glaucoma. Recently, cases of each type have come to my notice, in which the picture apparently had been misinterpreted and the wrong advice given. It has seemed timely, therefore, to call attention to these observations and to emphasize this relationship between retinal arterial diastolic pressure and intraocular tension.

Case examples

Case 1. Miss H. R., secretary, aged 64 years, came in October 6, 1936, for advice.

A well-known eye surgeon, having made a diagnosis of glaucoma, had been watching her eyes for over two years. She had obviously failed to carry out his instructions regarding the use of pilocarpine. At a recent examination on finding the fields markedly reduced, he had advised immediate operation. In conversation with him personally he told me that her tension had never been above 30 mm. Hg (Schiötz), but that the marked reduction in her fields of vision seemed to call for immediate operation. There was no history of pain nor rainbow vision. Her blood pressure had always been low.

Examination. The patient's corrected vision was R.E. 20/10? L.E. 20/15+. The tension, with fingers, was normal. The pupils were small, equal, round, and active (the patient had been using pilocarpine for three days). The tension, Schiötz, in each eye was 16 mm. Hg; McLean, each eye 25 mm. The visual fields, with a 1-mm. test object, were concentrically contracted to 30 degrees in each eye, the temporal and nasal field contractions being equal; the blind spots showed an irregular contour very suggestive of glaucoma.

The patient was ordered to omit pilocarpine for 24 hours and to return at 8:00 a.m.

October 7, 1936. The pupils were 3 mm. in diameter. Viewed with the ophthalmoscope, the media were clear, the discs negative except for a shallow temporal cupping (on the left more than on the right). The tension, McLean, was R.E.

30 mm., L.E. 33 mm., with the Schiötz tonometer each eye registered 19 mm. The blood pressure at this time was 138/88, but, as shown later, this was a high pressure for her, and doubtless owing to the excitement induced by the possibility of her undergoing an operation. Two-percent pilocarpine four times a day was ordered.

October 14 1936. Fields, with a 1-mm. object extended to 50 degrees nasal and temporal and 40 degrees above and below. The blind spots were slightly large but more regular in outline. The patient was urgently impressed with the necessity of using the pilocarpine regularly and continuously.

When last seen by me the blood pressure was 140/70. The blind spots were large but regular; the fields with a 1-mm. test object were between 40 and 50 degrees all around. Tension, McLean, in each eye was 35 mm.; Schiötz, each eye, 19 mm.

Discussion. This is evidently a case of incipient glaucoma in which an operation is not indicated provided the patient will use pilocarpine as needed. Several times during this period of observation the diastolic pressure was 70 mm., and it probably had been lower than that much of the time in the past. When, therefore, the intraocular tension rose to 30 (Schiötz) the difference between intraocular tension and diastolic pressure was low enough to produce the concentric contraction of the fields of vision and also the irregular blind spots. The cupping of the discs was similar to that observed with optic atrophy rather than with glaucoma. The vision was 20/15+. With the use of the pilocarpine the blind spots were normal and the fields became enlarged for a 1-mm. test object. Furthermore, the nasal field was as large as the temporal field in each eye. This picture, it would seem, developed because of a lack of blood supply to the retinae owing to failure to maintain a sufficient difference between the intraocular tension and the retinal arterial diastolic pressure. It called for an effort to keep the blood pressure at a higher level at the same time reducing the intraocular tension.

The patient's general practitioner was requested to prescribe treatment to increase her blood pressure, and the patient was requested to return to her former doctor for continued observation and treatment.

Case 2. A doctor aged 63 years, came in December 11, 1935, for advice. He had been told by a well-known eye surgeon that he had a glaucoma which required operation.

The previous examiner had evidently used a weak solution of pilocarpine which, he said, did not reduce the intraocular tension. No pilocarpine had been used for over two weeks. The reported blood pressure was 160/100. There was no history of pain nor rainbow vision.

Examination. The corrected vision each eye was 20/15 — 1; the tension with fingers was within the upper limits of normal; the pupils, 2 mm. in diameter, were round, equal, and active; the blind spots and fields without abnormalities (color fields were not taken); the corneae were not anesthetic; the anterior chambers were of normal depth.

The ophthalmoscope showed media to be clear; the fundi disclosed early hypertensive vessel changes; the discs were normal, having large physiological cups, not glaucomatous. The tension, Schiötz, was R.E. 26 mm. L.E. 28 mm.; McLean, R.E. 40 mm., L.E. 48 mm.

Pilocarpine was ordered, 1 percent once a day at night. This has been sufficient to keep the intraocular tension (Schiötz) at, R.E. 19 mm., L.E. 22 mm.; McLean, R.E. 35 mm., L.E. 38 mm.

The blind spots and fields have remained normal with 1-mm. test objects.

The corrected vision is 20/15 each eye and the discs have shown no glaucomatous cupping. The dark adaptation has not been tested. The blood pressure has remained approximately 160/100.

Discussion. This is obviously a case of incipient glaucoma in which, however, operation is not indicated, since the intraocular tension is so easily controlled with pilocarpine. In as much as the patient doubtless had an increase in both blood pressure and intraocular tension for some time prior to the previous examiner's diagnosis of glaucoma, it would seem that the hight diastolic pressure present had contributed largely toward preventing the glaucoma from producing other symptoms than the increase in intraocular tension.

May I suggest that we apply Lauber's and Sobanski's teachings regarding the care of these types of glaucoma; in that low arterial diastolic pressures should be raised, and that high arterial diastolic pressures should not be reduced, except, of course, in those cases which for other reasons require such reduction.

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LUNDSGAARD'S MODIFICATION OF HOLTH'S IRIDENCLEISIS

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To designate all forms of increased intraocular pressure as glaucoma is misleading and sometimes causes us to draw false conclusions. For example, if the tonometer registers a few points above normal in both eyes this reading may prove to be a normal tension for the particular individual. If careful observation over a long period of time failed to detect a tissue damage, such as field defects, scotomata, or changes in the discs, the diagnosis of glaucoma was probably incorrect. Just as some individuals seem to carry a high blood pressure without damage to the tissues in the body so some subjects may safely carry a higher intraocular tension than is usually considered normal. I have seen some patients with tension of 40 to 50 mm. Hg over a period of years with no apparent damage to the intraocular tissues.

The greatest cause of confusion, it would seem, is the failure to recognize secondary glaucoma as secondary or to separate it from simple glaucoma. For example, a patient complains of blurred vision of several months' duration in *one* eye, usually without pain. Examination shows the pupil to be slightly dilated, there are possibly a few K. P. on the cornea, the iris is discolored, the disc a trifle pale and possibly cupped, the field constricted nasally, the tonometer registering from 40 to 60 mm. Hg. The other eye is perfectly normal. This is not a case of true glaucoma, and in a large number of such cases an etiological cause can be found either in the eye itself or in some systemic disease. This condition might be termed "pseudo-glaucoma" to distinguish it from true idiopathic glaucoma and from the secondary glaucoma that arises from some previous disease of the eye. Experience shows that thyroid extract, tuberculin, autogenous vaccines, or elimination of focal infection will clear up the majority of such conditions. Surgery is contraindicated, and neither miotics nor mydriatics influence the course of the disease. When a number of these patients improve after a certain course of general treatment we may persuade ourselves that we have discovered the long-sought cause of glaucoma, whereas these were, in fact, not cases of glaucoma in the true sense of the word. I quite agree with Parsons that as soon as the diagnosis of glaucoma (compensated or incompensated) is made, surgery is indicated.

These true glaucomas are binocular and only about 8 percent of them are acutely inflammatory. Of all blindness in the United States 4.6 percent is caused by glaucoma, and 90 percent of these cases are of the simple variety, according to Gradle.

Although a peripheral iridectomy may be the operation of choice during the first 48 to 60 hours of an acute attack, especially to protect the unaffected eye, its application is limited, due to the small percentage of these cases and the necessity for early operation. An iridencleisis is equally effective and not much more disfiguring. In fact, the higher the tension and the shallower the anterior chamber, the simpler is the performance of this operation, for the iris in these cases usually presents in the wound.

To effect a permanent cure in the remainder of such acute cases and in the 92 percent of simple glaucomas, some form of iris-inclusion operation is necessary; though sometimes a cyclodialysis will relieve the tension. The trephine openings that remain patent usually have

more or less iris-inclusion from the iridectomy. The same applies to the Jervey operation.

I should hesitate to disturb the equanimity of those who perform a good trephining or any other operation and are perfectly satisfied with their results by

concerned. There have been no infections and no enucleations and, in so far as I can judge, no loss of vision due to the operation itself. The tension in 95 of these eyes is very close to normal and there are very few bulging flaps. Most of the eyes give the appearance of a small iri-

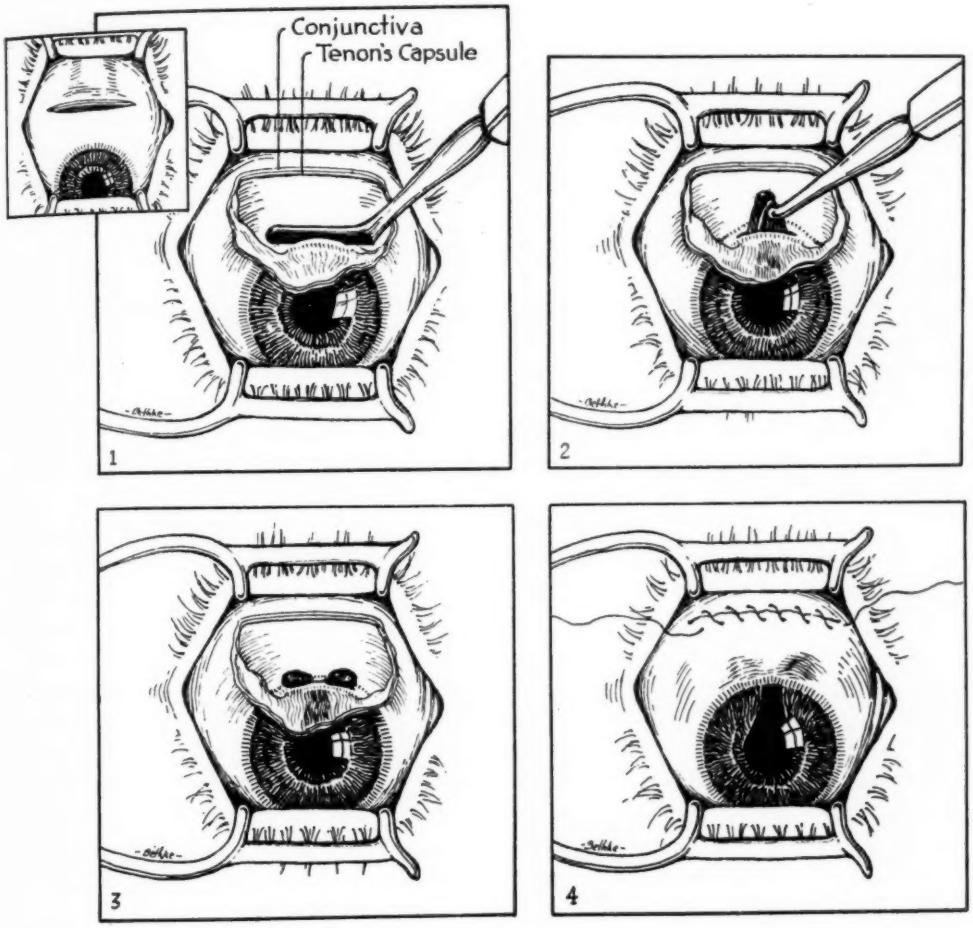

Fig. 1 (Constantine). Four steps in Lundsgaard's modification of Holth's iridencleisis operation.

suggesting some other form of operation. For my part, after using the Elliot operation for 23 years I liked it less every year, and when Professor Lundsgaard demonstrated to me an iridencleisis operation I was delighted to adopt it. In 95 of 107 eyes (70 individuals) it has proved entirely satisfactory so far as tension is

dectomy. Aside from juvenile glaucomas and two cases secondary to a previous iridocyclitis, the most unfavorable results have been in individuals with prominent eyes that have very thin conjunctivae and Tenon's capsules, especially those 'in whom the capsule is tightly bound to the underlying sclera. This peculiarity is espe-

cially noticed in negroes. I make a point to separate the capsule well in all directions in such cases.

Preparation for operation: The patient is directed to instill oxycyanide of mercury 1:5000 in the eye three times a day for three days previous to the operation. Three grains of sodium amytal are given about an hour before the operation. After the patient is on the table 20-percent argyrol is instilled and a few minutes later the eye is irrigated with boric-acid solution. Then 4-percent cocaine is instilled, the eyelids are washed with soap and water and painted with iodine and alcohol. Three injections of novocaine 2-percent with adrenalin are made; one, in the external canthus and lower eyelid; the next, 0.5 c.c. penetrating above the internal lateral ligament into the orbit; the third, about 0.5 c.c. under Tenon's capsule at the site of the flap.

Technique of operation: A long straight incision is made through the conjunctiva and Tenon's capsule just below the insertion of the superior-rectus muscle. The double flap, which has already been dissected by the novocaine, is turned down, but usually needs a few snips of the scissors to clear it up to the edge of the cornea, and is undermined slightly on the sides. A straight incision is made with a Lundsgaard corneal knife at the limbus into the angle of the anterior chamber. The depth of the incision can be judged by the width of the blade (2 mm.). If the iris does not present in the wound, as it usually does in the high-tension cases, it can be drawn in with a blunt hook or by iris forceps. It is held between two pairs of iris forceps, and a straight linear incision is made through the sphincter muscle with the DeWecker scissors. The cut edges of the iris are drawn gently to the angles of the wound and left in the wound. The flap is replaced and the wound edges closed with a running silk suture. An ointment of oxycyanide of mercury 1:5000 with 0.25-percent hyoscine is inserted and the eye closed.

There is little if any reaction from the operation. The eyes are irrigated with boric-acid solution and a mercury ointment is used for the next two or three days. The stitch is removed on the third or fourth day and the patient discharged from the hospital. I usually operate on both eyes at the same time.

Conclusion: Lundsgaard's modification of Holth's iridencleisis operation as here described and depicted has in the author's hands been successful in practically every case of true glaucoma, either compensating or incompensating. Failures have been observed only in high-tension cases that are not referable to true glaucoma, such as in juveniles and in patients suffering from some form of general poisoning ("pseudo-glaucoma"). It is true that similar results have been obtained by a number of other operations (see Burch's discussion of Wheeler's article in the Archives of Ophthalmology, 1936, Oct., p. 574), but because of its simplicity the operation here described is commended to the attention of ophthalmologists who have not been uniformly successful with other methods, with the warning that results cannot be expected in cases of high tension from systemic causes. It is, however, undoubtedly true that, even in these, eyes which otherwise might have been lost have done well after an operation.

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GONIOSCOPY OF THE SURGICAL COLOBOMAS OF THE IRIS

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When in 1857 Von Graefe introduced iridectomy for the treatment of glaucoma, he established one of the essentially basic operations of ophthalmology. Elliot said: "If he had given the world nothing else, he would not have lived in vain."

It is generally known that glaucoma is a disease in which treatment is chiefly surgical. At the present time, when efforts have been made to introduce new hypotensors into ophthalmic therapeutics and new ways of employment of the old, it is well to remember the classical words of De Wecker: "If miotics have not cured even one case of glaucoma, they surely have prevented many patients from being cured."

It is generally accepted that iridectomy is the only practical operation in acute cases of glaucoma. Etienne Joseph,[1] in an investigation carried out with another end in view in the wards of Terrien, Morax, Poulard, and Magitot, found that in the treatment of 43 eyes with acute glaucoma, 37 iridectomies, but only two trephinings and four sclerectomies were performed. The choice of the former operation is also almost unanimous in the so-called prodromal period of glaucoma, or as a prophylactic in suspicious cases when the fellow eye has suffered the disease.

In chronic glaucoma, iridectomy never has achieved such complete endorsement. Even Von Graefe had little faith in its efficacy. Efforts have been made from the very beginning to substitute for it many kinds of operations (iridencleisis, sclerotomies, sclerectomies, trephining, cyclodialysis, and others), but always, when the enthusiasm momentarily awakened by the new operation died down, surgeons returned again to the old iridectomy (Elliot). I also believe that in the treatment of the different kinds of chronic glaucoma, iridectomy, on the one hand, is the least harmful, and, on the other, the most effective operation in many of them. In chronic congestive glaucoma with delayed attacks, it is at the beginning (together with cyclodialysis) the best intervention. Uribe Troncoso[2] has stated that fistulization remains as the last resource. It should be made only in advanced chronic cases, when the angle is entirely closed and the eye degenerated. According to the same author, iridectomy should be used in simple cases of glaucoma if miotics fail, the visual field narrows, scotoma advances steadily, and the angle begins to close.

Thus, over the long period of three quarters of a century, iridectomy since its inception has kept its place in the first rank amongst operations for glaucoma. Very few interventions can be found in surgery which have stood as well the test of time and the inroads of new techniques.

However, it is astonishing that, up to the present, we are not yet acquainted with the real mechanism producing the results in such a fundamental surgical procedure.

The many different explanations advanced have always been dependent upon the belief of each author or of each period in regard to the pathogenesis of glaucoma.[2, 3, 4, 5, 6]

Von Graefe, who considered glaucoma to be induced by an excess of intraocular fluids, explained the good effects of iridectomy by the suppression of a part of the iris and diminished aqueous secretion. He also stated that one case in every 15 developed a true filtrating scar in the

scleral wound, but did not attribute any therapeutic importance to the latter condition. De Wecker did not agree with him. He believed the increased drainage to be due to a filtering scleral scar. The latest and most ardent supporter of this theory was Lagrange,[6] who tried to establish a permanent drainage through a scleral hole.

Fuchs was the first to note that aseptic wounds of the iris show very little tendency to heal. This fact was proved by Parsons, T. Henderson (principal supporter of the theory), and Malcolm McBurnay. Henderson believed that the traction made on the iris during the performance of iridectomy produces traumatic crypts, lacerations, and fissures near the border of the iris, which, together with the unhealed lips of the coloboma, make the absorption of the aqueous humor easier through the veins of that organ.

Axenfeld asserted that a detachment of the choroidal coat of the eye takes place in antiglaucomatous iridectomy and is the real cause of the fall of tension. The effect, therefore, would be the same as from cyclodialysis (Heine); namely, communication of the anterior chamber with the suprachoroidal spaces.

Bettremieux, following Exner, called attention to the fact that ligature of the anterior ciliary veins produces glaucoma, which he explains by the blocking of the outlet for circulation. He considered the good effect of iridectomy to be due to the suppression of stasis through the communication established in the lips of the coloboma between the veins and arteries of the iris.

None of the former theories, however, has had so great a vogue or has so tenaciously survived as the belief of the mechanical opening of the iridociliary angle by iridectomy. When Knies, in 1876, reported his pathological investigation of glaucomatous eyes, which was responsible for his famous discovery of the closure of the angle in glaucoma, it appeared that the facts could not be more convincing for the establishment of a general theory of pathogenesis and for the explanation of the action of iridectomy. The latter, no doubt, cured the illness by attacking its cause; namely, by removing the obstruction and freeing the angle. This has been admitted by classical authors; even in our time, Elliot[5] said: ". . . it is useless to tear away the iris after the sinus of the chamber is closed . . ." ". . . if an iridectomy is to be successful by reopening the normal filtration area in the neighborhood of the iris base, it is essential that the procedure should be undertaken at an early stage, before the approaches to the angle of the chamber have been obliterated and sealed down by plastic exudate . . ." ". . . iridectomy undertaken with the deliberate intention of freeing the natural channels of excretion should only be resorted to in those early cases in which there is reason to believe that such a feat is possible. Once plastic inflammation has blocked the angle chamber, the role of this procedure ceases . . ."

Accordingly, from the very beginning, precise rules were given for effecting the removal of the root of the iris: scleral incision as far back as possible, ample traction of the iris, cutting with scissors parallel to the limbus, and so on. The mechanical retention of fluids due to the occlusion of the angle could not be proved by anatomo-pathological examinations, since these nearly always were made in old degenerate glaucomatous eyes, nor had experimentation advanced the theory. At this juncture the improvement of gonioscopy by Uribe Troncoso[7] put an end to the discussion. Examination of the angle in glaucomatous patients enabled him to see that the occlusion was not

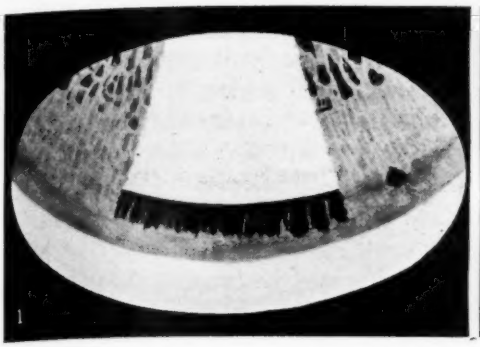

Fig. 1 (Solanes). Case 1, right eye. Gonioscopy showing imperfect iridectomy.

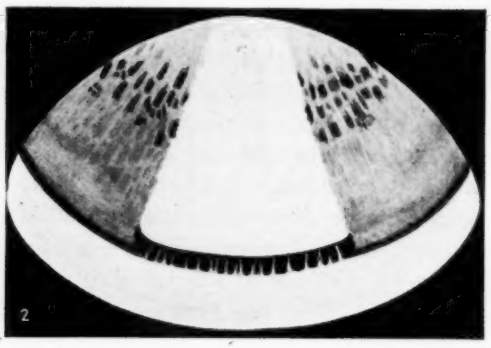

Fig. 2 (Solanes). Case 1, left eye. Gonioscopy showing perfect iridectomy.

constant, that it did not mark any variety of glaucoma, and that it had no relation either to the degree of hypertension or to the disturbances of the field of vision or of the visual acuity; furthermore, that far from being the first phenomenon to produce the disease, it was the result of a well-developed glaucoma.[8] It is therefore necessary to disprove definitely the old explanation that antiglaucomatous iridectomy to be successful must open the iridociliary angle.

Gonioscopy of the surgical colobomas is also of great importance in the solution of the problem.

Since 1925 Uribe Troncoso has contended that the opening of the angle by iridectomy is not necessary for the success of intervention. In that year, he reported the gonioscopic examination of three eyes in which iridectomy had lowered the tension, although the angle of the anterior chamber remained closed. In 1926 he published the history of two more cases, similar in every way to the former ones; and in the year 1933, at the Madrid Congress, he finally reported a sixth typical case. Werner (quoted by Uribe Troncoso) has also published the history of three eyes, in which iridectomy cured acute glaucoma without opening the closed angle, and of four cases of chronic glaucoma in which, on the other hand, the operation was not successful in reducing the tension in spite of the perfect normality of the filtration angle.

Herewith, rather briefly described, are the clinical histories of five cases (six eyes) with surgical coloboma of the iris which I examined with Uribe Troncoso's gonioscope and C contact glass (Bausch and Lomb). My findings entirely agree with those reported by Uribe Troncoso and Werner.

Report of cases

Case 1 (Chronic simple glaucoma). A man aged 60 years presented himself, having arteriosclerosis, hypertension, and bilateral simple glaucoma. Eight years previously, while in Italy, he had had an iridectomy performed on both eyes, with favorable results; namely, immediate lowering of tension to normal and the arrest of decreasing visual acuity and narrowing of the visual fields.

The ocular findings at the time of presentation were: *Right eye,* vision of 5/10, atrophy of the iris, marked excavation of the disc, narrowing of the temporal and nasal fields, and considerable increase in the size of the blind spot. The intraocular tension (Torroella) was 19 mm. Hg measured on the cornea, and 18 mm. in the posterior segment. Gonioscopic examination (fig. 1) proved the existence of

scleral annular synechiae hiding the ciliary-body and Schlemm's-canal zones in all quadrants. Exploration of the coloboma of the iris showed a rather wide band of iris tissue left adherent to the sclera through the coloboma. The ciliary processes were apparent and rather atrophic. In short, the operation had not freed the iris angle, a stump of iris remaining, although the tension had become normal.

Left eye: Here were vision of 9/10, an incipient atrophy of the iris, a slight temporal excavation of the disc, narrowing of the nasal field, and typical Bjerrum scotoma. The anterior tension was 20 mm. Hg, posterior 17 mm. Gonioscopy disclosed the angle of the anterior chamber open all around the limbus. In the coloboma the tearing away of the base of the iris had been perfectly accomplished, no band of iris tissue remaining. The ciliary processes were atrophic as in the right eye (fig. 2). In short, in the left eye the angle was free in all of its parts, representing a good complete iridectomy. The favorable result of the operation in regard to the lowering of tension was the same in both eyes, although in the left, the angle was open and the coloboma perfect, while in the right, the operation had not succeeded in opening the angle nor in tearing away the iris from its new insertion. It should be mentioned that in this eye the visual acuity and field were severely damaged even before the iridectomy.

Case 2 (Congestive glaucoma). A woman, 70 years old, suffering from arteriosclerosis, came to the clinic with a severe attack of acute congestive glaucoma in the left eye of eight days' duration. The eye was very red, the cornea edematous, and the anterior chamber shallow. The tension could not be determined with the tonometer because of the great sensitiveness of the eye, but was estimated with the fingers as "plus three." The patient could count fingers at 50 cm. An iridectomy was performed immediately, and the pain stopped, the irritative symptoms disappeared, and the patient after 15 days saw fingers at three meters' distance. The tension continued invariably low. Seven months after the operation it reached 18 mm. Hg, in both cornea and posterior segment.

Gonioscopy (not made before the operation due to the hazy condition of the cornea) later gave the following results: the angle free nasally, inferiorly and temporally; ciliary and Schlemm's-canal regions of normal width, though spattered with black-brown pigment. The coloboma was seen to have atrophic borders, and a wide stump of iris remained with the left edge slightly adherent to the cornea, closing the filteration angle completely upwards.

Briefly, there was a good surgical result; namely, normalization of the tension and increase in the visual acuity with open angle, except precisely in the coloboma, where the iris could not be torn away from its base, and a synechia persisted.

Case 3 (Congestive glaucoma). A man, 38 years old, in good health, came to the clinic with an acute attack of congestive glaucoma of two days' duration. There was great vascular injection, corneal edema, a shallow anterior chamber and mydriasis. The tension, 45 mm. Hg in the cornea, was scarcely 25 mm. in the posterior segment. The patient counted fingers at a distance of one meter. Iridectomy relieved the pain and the vascular injection. Vision improved rapidly in the following days up to 9/10 and the tension remained for two weeks at about 23 mm. Hg, anteriorly and 18 mm. posteriorly. After 15 days, however, there was a tendency to increased tension, reaching 35 mm. in the cornea and 20 mm. in the scleral segment. The constant use of miotics lowered it again to the neighborhood of 20 mm., but every time instillation was

interrupted, an increase of more than 30 mm. Hg took place.

Gonioscopy (impossible to perform before intervention for the same reasons as in case 2) a month and a half later gave the following results: The angle was free all around the limbus. In the coloboma were no remains of the iris. The ciliary processes were normal.

In brief, the patient with the angle of the anterior chamber open, had a coloboma surgically perfect. There was, however, tendency towards hypertony, which could only be neutralized by the uninterrupted use of miotics.

Case 4 (Chronic congestive glaucoma). This patient was 74 years old, and for 10 years had suffered from attacks of chronic congestive glaucoma in the right eye (the left eye was eviscerated 50 years previously because of panophthalmitis). An iridectomy had been performed three months previously, resulting in the disappearance of pain and improvement of visual acuity. At the time of the examination the eyeball was not injected, the anterior chamber was of normal depth, the iris atrophic in parts, the papilla normal, visual acuity equal to 2/10, and tension (Torroella) 27 mm. Hg in the cornea and 30 mm. in the scleral segment.

Gonioscopy showed the angle open in the nasal, inferior, and temporal regions, and a narrow band of the iris adherent to the base of the coloboma.

In short, a good therapeutic result up to the moment of the examination: the angle was free; iridectomy did not remove the base of the iris.

Case 5 (Chronic simple glaucoma). A woman, 65 years old, with arteriosclerosis, whose left eye had been enucleated because of glaucoma two years previously, suffered for six months a decrease of visual acuity without pain nor signs of ocular irritation. The diagnosis in another clinic was simple chronic glaucoma. An iridectomy was performed, which caused the normalization of tension and a slight increase in vision. At the time of the examination (four months after the operation), the iris was atrophic; there were some posterior synechiae on the edge of the coloboma; vision was 1/10; and tension 26 mm. Hg (Schiötz).

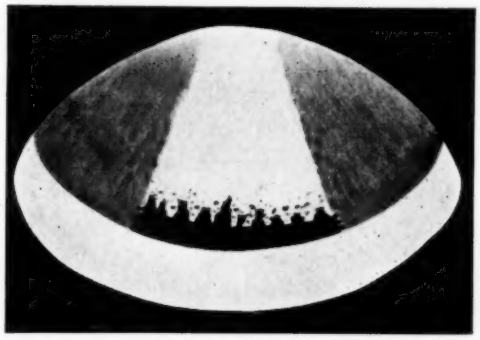

Fig. 3 (Solanes). Case 5, right eye. Gonioscopy showing imperfect iridectomy.

Gonioscopy (fig. 3) showed the angle closed all around. The coloboma was defective, a large band of the posterior mesodermic sheet of the iris remaining fastened to the capsule.

In short, another case of normalization of the tension in spite of the occlusion of the angle, and the bad technical result of iridectomy. (The clinical history suggests that, perhaps, the glaucoma was secondary to a process of torpid iritis, which would have caused part of the posterior sheet of the iris to adhere to the lens capsule.)

Summarizing, I wish to emphasize four facts brought out in the clinical histories:

1. There were two eyes, the right eye in case 1 and the eye in case 5, in which the iridectomy normalized the tension and stopped the lowering of the visual acuity in spite of the fact that it was not possible to open the iridociliary angle.

2. An eye (case 2) in which iridectomy cured the attack of acute glaucoma, but did not remove the tendency towards hypertension, in spite of the fact that the

angle was completely free and the coloboma perfect.

3. The two eyes in case 1, one with the angle closed and the coloboma defective, the other with the angle and coloboma in good condition, had results equally favorable after iridectomy.

4. In the eyes in cases 2 and 4, it is noteworthy that iridectomy did not succeed in removing the iris root. It is not known whether the rest of the angle was or was not open before the operation.

The results of these clinical histories corroborate the conclusions of Uribe Troncoso,[2] which, insofar as they are related to the subject under discussion can be summarized as follows: (a) The reopening of the iridociliary angle is not necessary to the success of iridectomy in glaucoma. (b) The excision of the base of the iris—unless future observations show the contrary to be true—is not accomplished in the majority of cases of iridectomy. (c) The existence of an open angle and the perfect excision of the root of the iris does not guarantee the therapeutic success of the operation.

Once we reject the simple mechanical conception of the opening of the iridociliary angle by iridectomy, it is necessary to bear in mind a series of facts which suggest the important part that surgical traumatism may have on the nervous system in reference to the decrease of tension.

More than 40 years ago, Abadie[9] insisted that a narrow iridectomy has the same hypotensive effect as a wide one; that neither sectioning of the pupillary sphincter nor the exclusively peripheral iridectomy is effectual in reducing the tension, whereas total iridectomy (from the pupil to the iris root) is unquestionably so, even though the portion of the organ removed should be small. The popularization of fistulizing operations has given to all ophthalmologists the opportunity to observe cases of trephining in which manifestly there is no filtration, in which, however, the tension remains low. On the other hand, the hypotensive results of operations, apparently unlike one another, such as trephining, sclerotomy, iridencleisis, cyclodialysis, and others, make us suspect that their effect may not be due to the specific function that each appears to have (fistula in trephining, communication of the chamber with the suprachoroidal spaces in cyclodialysis, and so on), but to what they may have in common; namely, surgical traumatism of the iris and ciliary region which, perhaps, disturbs the diastaltic arc of reflexes maintaining tonus.

Modern investigations of ophthalmotonic reactions to experimental stimulation of the eye,[10] tend to confirm this theory. Irritation of the organs of the anterior segment of the eye, especially of the iris and ciliary region (puncture, traumatism, cauterization), produces modifications of the tonus which Weekers finds generally systematized as follows: a first transitory phase of ocular hypertension, followed by another lasting one of hypotonia. So strong is the effect of the stimulation on the nervous system that the reaction, when intense, also appears in the fellow eye. Clinicians already were aware of this possibility. It is a well-known fact that an antiglaucomatous operation in one eye may produce an acute glaucoma in the other eye. Velter has reported, on the other hand, two cases of bilateral chronic glaucoma in which sclerectomy in one eye was responsible for the normalization of tension and visual improvement in the fellow, untreated eye. Towin, Protopopof, and Urnishewskaia[11] have studied in man the effect that an operation performed on one eye has on the other. They observed that in nearly all intraocular operations (cataract, optic iridectomies, and others) there are modifications of tension in the other eye, hypotension predominating.

The mystery persists, but the method of gonioscopy in the hands of Uribe Troncoso has thrown considerable light on the subject, proving that the effect antiglaucomatous iridectomy is not dependent upon the reopening of the iridociliary angle. Everything leads us to hope that the study of the action of surgical traumatism on the nervous system of the eye will help us to understand better the mechanism responsible for the good results in operations for glaucoma.

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[9] Abadie. Travaux et mémoires de clinique et thérapeutique oculaire. Paris, 1930.

[10] Begun by Pesme and Duthil and continued by Fromaget, Bonnefont, L. Weekers, Magitot, and others. See: Weekers, L. Réactions ophtalmotoniques expérimentales provoquées par l'injection orbitaire de diverses substances. Arch. d'Opht., May, 1931. Ibid. Lois communes des réactions ophtalmotoniques expérimentales directes et consensuelles provoquées par differents procédés. Ibid. Réactions ophtalmotoniques expérimentales par piqûre du corps ciliaire. Arch. d'Opht., Jan., 1932. Weekers and Fauchamp, J. J. Contribution a l'étude clinique des réactions ophtalmotoniques expérimentales. Bull. de la Soc. Belge d'Opht., 1935. Magitot. Réactions hypertensives normales et pathologiques après compression du globe. Ann. d'Ocul., Oct., 1931.

Diaz Dominguez. La tension oculaire après pesée sur la globe. Arch. d'Opht., Jan., 1932.

[11] Towin, Protopopof, and Urnishewskaia. On the action of operations of one eye upon the tension of the other. Graefe's Arch. f. Ophth., 1934, v. 131, p. 554.

NOTES, CASES, INSTRUMENTS

CORNEAL DYSTROPHIES (TYPES)*

ROBERT VON DER HEYDT, M.D.
Chicago

Thirty years ago Fleischer[1] expressed the opinion that the various types of corneal dystrophies may belong to a common familial group. Uhthof, Pillat, and others described combinations, and Gutzeit saw a father who had nodular dystrophy while his son presented the well-known lattice type. Maury of the Wilmer Institute has just described interesting histological findings in a case which he calls both lattice and nodular dystrophy. From the illustration it is clinically a lattice type with spots. There is no description of elevated nodules such as are characteristic of advanced Groenouw dystrophy. Koby and Pillat maintain that the slitlamp definitely shows morphologically different types.

At the recent meeting of the German Ophthalmological Society, Buecklers[2] reported a series of hereditary corneal dystrophies based on an examination of 800 persons—evidently familial ramifications—residing in 35 small towns in one locality. He classified three morphological groups: the types of *Fleischer, Haab-Dimmer,* and *Groenouw.* The most common type seen was the circumscribed parenchymal disc dystrophy of *Fleischer.*

FLEISCHER TYPE

It may begin as early as in the fifth year and progress slowly until the thirtieth or fortieth year. Two family groups showed 68 cases—dominant in heredity.

Axenfeld[3] in 1930, at the Osaka Congress, called this type "dystrophia corneae adiposa or xanthomatosa." The changes in this type clinically are composed of a crumblike yellowish disciform infiltrate. The lesions microscopically seemingly correspond with the areas of intralamellar cement substance and show no preference as to depth. The epithelium is rarely involved, although I saw a case, in 1925, which presented added superficial, definitely circinate lesions. I also saw a three-case group in mother and two daughters.

The most interesting case of this type—the one illustrated—has been under my constant observation for over 13 years. The patient is now 48 years old. During this period because of slow progression of the lesion his vision dropped from 20/80 to 12/200. Peculiarly clear, translucent, vertical, cylindrical exudate lines may be seen just anterior to Descemet's membrane—one of these extends beyond the involved disc area.

HAAB-DIMMER TYPE

In 1898 Haab[4] and Dimmer described the well-known lattice form of corneal dystrophy. It is composed of irregular double-contoured lines, often split at their ends. Among this group were the dominantly hereditary Infirmary cases recently described by Shapira. The illustration shows one of these. In all the cases I have seen there seemed to be a relative sparing of the pupillary area in the incipience.

Löwenstein considers this type a trophoneurosis while A. Fuchs denies this conception, citing that a degeneration of connective tissue may occur without involving the nerves—for instance arterio-

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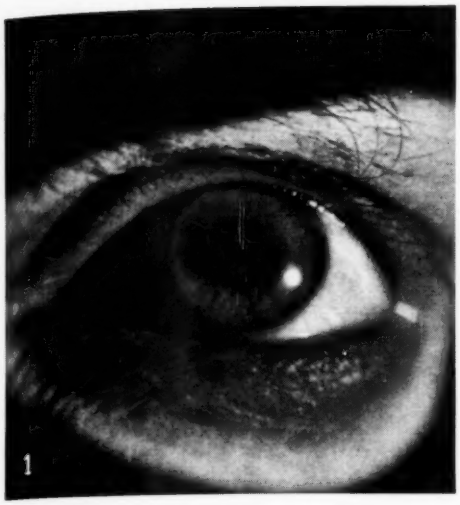
* Read before the Chicago Ophthalmological Society, November 16, 1936.

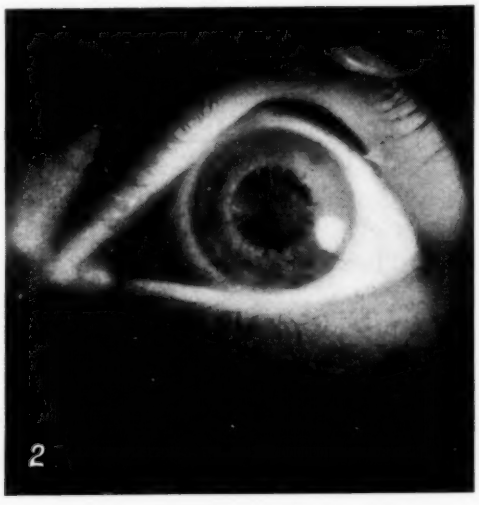
[1] Fleischer, B. Arch. f. Augenh., 1905, v. 53, p. 263..

[2] Buecklers, M. Deutsche Ophth. Gesells., 1936, p. 73.

[3] Axenfeld, T. Klin. M. f. Augenh., 1930, v. 85, p. 493.

[4] Haab, O. Zeit. f. Augenh., 1899, v. 2, p. 235.





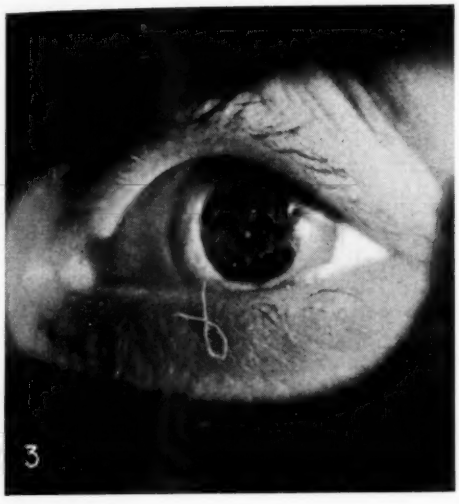


Fig. 1 (Von der Heydt). Fleischer type of corneal dystrophy.

Fig. 2 (Von der Heydt). Haab-Dimmer type of corneal dystrophy.

Fig. 3 (Von der Heydt). Groenouw type of corneal dystrophy.

sclerosis.

In this connection it is of interest to recollect that Haab in 1916 also described seven cases of a different type of corneal change which he called alphabet keratitis; this because of the linear design, the superficial lesions resembling letters like V, W, Z, and A. He believed it tuberculous in origin. (My translation of his original monograph on the subject was read before this Society 20 years ago.)

Groenouw type

Groenouw[5] first described nodular dystrophy of the cornea in 1890. The lesions begin early in the second decade of life as a diffuse spotting composed of faint rounded and irregular superficial and deep cloudings. These increase in number and density, become nodular, and by their interference may lead to practical blindness in old age. The nodules are irregularly rounded with offshoots and are situated at varying depths. The epithelium is elevated.

[5] Groenouw, A. Arch. f. Augenh., 1890, v. 21, p. 284.

According to Axenfeld, this dystrophy is a hyaline degeneration and may be related to the Haab-Dimmer lattice type, for combinations are on record.

Buecklers from his study of 800 individuals thinks the heredity is recessive—family groups are not so frequently found.

In the Dimmer Festschrift (1925) Salzmann described a related dystrophy. Some of his cases showed eczematous pannus and were unilateral. The condition was not supposed to be familial.

I have seen but few well-advanced cases of Groenouw dystrophy, but many of moderate involvement, such as the one illustrated.

Vogt in his new atlas described but six cases of dystrophy of the corneal stroma, one of these in a child five years old.

Buecklers believes that each of the three types of corneal dystrophy shown presents a definite clinical entity. He suggests that the term familial dystrophy as a description of all types be abandoned. Waardenburg in discussing the report suggests Latin names be evolved descriptive of the three clinical types.

I have personally seen advanced cases of all types in which the distinctive characteristics of each were present to the exclusion of the others. I therefore agree with Buecklers that a division into the three groups shown would represent a proper basis for clinical classification.

25 East Washington Street.

BURNING; A SYMPTOM OF VERTICAL PHORIA*

LOUIS BOTHMAN, M.D.
Chicago

For several years, I have been impressed by the frequency with which patients volunteered the information that their eyes burned, often after driving or attending the movies but with regularity after reading. Other symptoms were relieved or disappeared after wearing glasses, but the burning frequently persisted.

No textbook mentions this symptom in connection with phorias. The only reference I found was to Marlow[1] who listed aching, smarting, and burning, which was found in 27 of 69 cases with hidden muscle imbalance; but he did not connect it with vertical phorias.

Patients whose symptoms persisted after correction of the refractive error and who had no disease of the conjunctiva were tested for phorias with a phorometer, the duction tests being made with the spot of light at 20 feet and at 13 inches.

Table 1 shows the results in a series of 55 patients ranging from 11 to 64 years in age of whom 26 were females and 29 were males. Forty-four were hyperopic and 11 myopic.

The symptoms occurring in this group and their frequency were: smarting 4 times, scratchy sensation 2, tiring 19, aching 7, headaches 19, sleepiness 2, blurring 9, dizziness 7, losing the place when reading 2, soreness of eyes 1, nausea 7, diplopia 4, print jumped 2, itching 6, twitching 1, tearing 3, redness 1, pulling or drawing sensation 2, and burning 55.

All of the patients with the last-named symptom had a vertical imbalance. This was not the only finding, to be sure, for several (8) had horizontal insufficiency as well.

Twenty-four of the series required base-up prisms (left) and 31 required prisms base down. The amount varied from one-half to 9½ prism diopters. The average was 1.3 prism diopters up and

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* From the Division of Ophthalmology, The University of Chicago, Dr. E. V. L. Brown, director. Read before the Chicago Ophthalmological Society, December 21, 1936.

[1] Marlow, F. E. New England Med. Jour., v. 210, p. 309.

TABLE 1
SYMPTOMS IN 55 CASES OF PHORIA

No.	Age	Sex	Hy.	My.	B.	Δ Up	Δ Down	D.	Sm.	Sc.	T.	A.	HA.	Sl.	Bl.	D.	L.P.	So.	Pain	N.	Di.	J.	It.	Twit.	Tear.	Red.	Pu.
1	21	F	+		+	1¼		4					+						+	+							
2	26	M		+	+														+++								
3	35	M	+		+	1							+		+												
4	47	F		+	+			¾							+				+								
5	11	M	+		+	⅓							+								+	+					
6	37	M	+		+	⅓					+	+	+			+											
7	22	F		+	+			1					+			+											
8	27	M	+		+			3			+																
9	19	F	+		+	1½					+		+				+			+							
10	31	F	+		+			1			+								+	+	+						
11	28	F		+	+			⅓					+		+	+											
12	41	F	+		+			⅓				+				+			+					+			
13	29	M	+		+	2							+			+											
14	23	F		+	+			¾					+														
15	22	M	+		+	⅓					+		+		+										+		
16	30	M	+		+	⅓							+			+											
17	27	M		+	+	2					+				+												
18	39	F	+		+			½			+		+					+					+				
19	46	M	+		+			6		+	+															+	
20	25	M	+		+			½																			
21	63	F	+		+	3															+						
22	23	M	+		+			½			+																+
23	43	M	+		+	¾																					
24	38	M	+		+			½	+		+																
25	42	F	+		+	½																					
26	32	F	+		+			1			+																
27	39	F	+		+	1½																					
28	31	M	+		+			1																			
29	30	F	+		+			1½			+																
30	20	M		+	+	2									+												
31	39	M	+		+	2½																					
32	32	M	+		+			1½				+															
33	34	F		+	+			⅔					+				+			+							
34	35	F	+		+			2	+		+		+														
35	42	F	+		+	1½																	+				
36	24	M	+		+			½			+																
37	17	M		+	+			½															+				
38	21	M	+		+			1¼			+	+															
39	28	M		+	+	¾					+																
40	25	M	+		+			2													+						
41	32	F	+		+			1					+										+				
42	20	M	+		+			1½					+							+							
43	40	F	+		+			9½			+				+												
44	27	F	+		+	½						+															
45	58	F	+		+			4				+								+							
46	22	M		+	+	1½									+					+							
47	40	F	+		+	⅓										+				+							
48	25	F	+		+			½		+			+														
49	37	M	+		+	½					+		+														
50	18	M	+		+			¾			+			+													
51	44	F	+		+	½																					
52	33	M	+		+	½			+			+								+							
53	37	F	+		+	¾																			+		+
54	64	M	+		+			½							+										+		
55	22	F	+		+			½	+				+	+													
			44	11	55	24		31	4	2	19	7	19	2	9	7	2	1	6	7	4	2	6	1	3	1	2

Hy. = Hyperopia; My. = Myopia; B. = Burning; ΔD. = Prism diopters; Sm. = Smarting; Sc. = Scratching; T. = Tiring; A. = Ache; HA. = Headache; Sl. = Sleepy; Bl. = Blur, D. = Dizziness; P.L. = Loses place easily; So. = Soreness; N. = Nausea; Di. = Diplopia; J. = Print jumps; It. = Itching; Tw. = Twitching; Tear. = Tearing; Red. = Redness, Pu. = Pulling. In case 3 there was ciliary spasm; in cases 4 and 33 migraine, and in case 34 questionable migraine; in case 4 there was a 3-percent difference of retinal images.

1.65 down or 1.4 prism diopters vertical phorias for the series.

It is not my intention to discuss treatment but merely to call attention to the relationship of "burning of the eyes," frequently the chief symptom of which the patient complains, and the presence of a vertical imbalance.

122 South Michigan Avenue.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

November 17, 1936

Dr. James J. Regan, *presiding*

The result of lens removal in high myopia

Dr. Edwin B. Dunphy said that extraction of the crystalline lens for high myopia is not new. In 1745, Joseph Higgs of Birmingham, England, suggested depression of the lens for relieving myopia, and, in 1763, Albrecht Haller advocated removal of the lens. Apparently the first ophthalmologist to attempt this operation was the Abbé Des Monceaux of Paris, who, in 1776, reported cases of myopia which were greatly benefited by lens extraction. His method consisted of an incision at the limbus, crudely similar to our keratome incision, enlargement of this incision on either side, rupture of the capsule, after which, he said, the lens "runs out." He made no mention of complications except to say that the iris may become entangled in the wound. It is interesting to note that the Abbé believed the cause of myopia to be a protuberant cornea made so by excessive volume of the lens.

Apparently the operation was not taken up generally by ophthalmologists until 60 years later, when it was revived by Fukala of Vienna. It was then attempted by many surgeons but later fell into disrepute because of infections, secondary glaucoma, and detachments of the retina.

Recent reports of the operation are not very frequent. Frölich in 1920 published 27 favorable cases without any complications. Pesmé of Bordeaux in 1927 reported good results in nine cases. O'Connor in 1933 reported success in 10 eyes. In one case of monocular high myopia, its operative correction (according to the author) permitted binocular vision with entire relief from a constant headache.

Elschnig in 1934 reported on 110 operations for myopia. He advised that only one eye be operated upon at a time, and the second one not until the first eye had been perfectly quiet for at least six months. The reason for this delay is the possibility of detachment of the retina, which may occur in any myopic eye. He did not operate on patients under 10 years of age. His method consisted in performing a discission in the lower half of the pupillary zone, so that, in case the lens swelled greatly, the upper half of the anterior chamber would remain deep enough to permit a keratome incision. In three or four days, when the lens had begun to swell, a keratome incision was made at the upper limbus, the remaining lens capsule lacerated, and the lens evacuated by suction. Eserine was then instilled. If some cortex remained after two weeks, the anterior chamber was again opened and the lens material expressed. If this second keratome incision was necessary, Elschnig suggested it be done in the meridian of the cornea having the greatest refractive power, thereby diminishing the astigmatism preëxistent or due to the first incision.

In his 110 operations, prolapse of the vitreous occurred in less than 5 percent. There were no infections, no secondary glaucoma, and no cases of serious iridocyclitis; there were, however, two cases of retinal detachment.

He did not believe that the operation should be performed when the myopia measures less than 10 diopters, unless it

were progressive; then, it might be undertaken in the case of a myopia as low as four diopters.

After this operation, one is surprised to find how much the visual acuity sometimes improves. The reason for this is, of course, that the retinal image with strong concave glasses is much smaller than in the emmetropic eye, and, therefore, vision is less than would be supposed.

nine eyes in five separate patients. Two of the patients were nine years of age, one was 10 years old, another 12, and the oldest was 22 years of age. All of the eyes were highly myopic, ranging mostly from 15 to 20 diopters. The vision in all of these eyes even with correction was poor, from as low as 5/200 to 20/70. The method of operation was discission and linear extraction. There were no complications except that in the patient

TABLE 1

THE RESULTS OF LENS REMOVAL IN HIGH MYOPIA

Name	Age	Refraction	Operations	Complications	Final Result
Marie B.	9	O.D. −15.00 D. Sph. = 20/200 O.S. −13.00 D. Sph. ⊂⊃ −3.25 D. cyl. ax. 180° = 20/200	O.S. Discission Linear cat. ext.	None	O.D. +2.00 D. Sph. ⊂⊃ +.75 D. cyl. ax. 105° = 20/70 O.S. +2.25 D. Sph. ⊂⊃ +2.25 D. cyl. ax. 90° = 20/70
Dorothy D.	9	O.D. −20.00 D. Sph. = 20/200 O.S. −20.00 D. Sph. = 5/200	O.D. Discission Linear cat. ext. O.D. Discission Linear cat. ext. O.S. Discission Linear cat. ext.	None	Needs needling O.U. O.D. −2.00 D. Sph. −1.00 D. cyl. ax. 15° = 20/40 O.S. −2.00 D. Sph. −1.00 D. cyl. ax. 180° = 20/50
Marguerite P.	10	O.D. −16.00 D. Sph. = 20/100 O.S. −10.00 D. Sph. ⊂⊃ −.75 D. cyl. ax. 165° = 20/30	O.D. Discission Linear cat. ext. Discission Discission	None	O.D. +3.00 D. Sph. ⊂⊃ −.75 D. cyl.ax. 180° = 20/100 No operation O.S.
Rose T.	12	O.D. −20.50 D. Sph. = 20/100 O.S. −20.50 D. Sph. = 20/70	O.D. Discission Linear cat. ext. Discission O.S. Discission Linear cat. ext. Discission	None	O.D. −1.50 D. Sph. = 20/40 O.S. +.50 D. Sph. ⊂⊃ −.50 D. cyl. ax. 105° = 20/30
John M.	22	O.D. −17.00 D. Sph. = 20/200 O.S. −16.00 D. Sph. = 20/70	O.D. Discission Linear cat. ext. Iridectomy Linear cat. ext. O.S. Discission Linear cat. ext. Discission	Secondary Glaucoma O.D.	O.D. −2.50 D. Sph. = 20/50 O.S. = 20/40 No improvement with any lens.

The operation is contraindicated if any gross macular lesion can be seen through a dilated pupil; or if the patient is able to wear a correcting glass which gives him 20/50 vision or better. It must be borne in mind that although an aphakic eye, formerly emmetropic, usually takes about a +11.00 spherical correction, a myopic eye of 11.00 diopters will not be rendered emmetropic by removal of the lens. It is necessary to have a myopia of at least 18.00 diopters in order to obtain emmetropia after the operation.

Dr. Dunphy reported the results in 22 years old a unilateral secondary glaucoma developed. In all cases the vision was decidedly improved after the operation. The eye with vision of 5/200 before operation required a —20.00 lens for that vision and after operation, with a —2.00 D.sph. ⊂⊃ —1.00 D. cyl. ax. 180°, the vision was 20/50. The visual results in the other eyes were correspondingly good.

In conclusion, Dr. Dunphy said that his excuse in reporting this short series of cases was to emphasize the value of this procedure to the highly myopic pa-

tient and to suggest that it be more frequently applied in suitable cases.

CATARACT EXTRACTION

DR. WILLIAM P. BEETHAM showed a colored motion picture of an intracapsular cataract extraction, using the Verhoeff corneoscleral stitch, and a short picture showing myotomy of the inferior oblique muscle.

ORTHOPTIC TRAINING

DR. LEGRAND H. HARDY read an interesting paper in which he attempted to show that, by means of visual training, retinal massage with oscillating images, and with the use of a synoptophore, improved vision, fusion, and stereopsis could be accomplished in strabismic patients as well as the production of parallelism. During the course of the evening Dr. Hardy showed the instruments he used for orthoptic training and how they worked.

Trygve Gundersen,
Recorder.

CHICAGO OPHTHALMOLOGICAL SOCIETY

November 16, 1936

DR. G. HENRY MUNDT, *president*

SOME TECHNICAL QUESTIONS CONCERNED IN CATARACT SURGERY

DR. WILLIAM F. MONCREIFF presented a paper on this subject which will be published in this Journal. In connection with his paper Dr. Moncreiff presented 22 patients with 29 postoperative aphakic eyes. These patients were shown as a demonstration of the results of lens extraction with the round pupil and with the corneoscleral suture, and were selected not because of any outstanding better results than those not shown, but because they responded to the request to come to the meeting. Twenty-one operations out of the 29 had been performed since February 15, 1936. All patients were operated on by the extracapsular method except one; in this case an intracapsular extraction was performed by the forceps-tumbling method. Twenty-six operations were performed without a peripheral iridectomy or iridotomy; in the other three cases a peripheral iridectomy was made. Discission was performed on two eyes, and a third may require it; in this case the lens extraction had been performed less than two months previously. In all of the other 26 eyes, visual acuity could not have been improved by a discission. The postoperative astigmatism was between 1.5 and 2.5 diopters in most cases; in six eyes it was only one diopter or less; in only four eyes was it over 2½ diopters, and in only one of these was it over three diopters. The visual results were: in 16 eyes, the corrected acuity was 1.0 or better; nine of these had 1.5—4 or better. Ten eyes had between 0.5 and 0.8, while only three eyes had less than 0.5. One of these had a senile macular degeneration, another a diabetic retinopathy, each with 0.3 vision. The third was a highly myopic eye with six diopters of astigmia, chorio-retinitic changes, and 0.5— corrected vision. In 22 eyes the corrected near vision was Jaeger 1; none had poorer vision than Jaeger 3, except the one eye with senile macular degeneration. In several eyes the pupil was slightly or moderately deformed by posterior synechiae to lens remnants. The pupil was displaced upward in two eyes, in one of which there was iris incarceration. In a third case there was a real iris prolapse (due to a faulty section), the only one in this group, despite which this eye had a corrected vision of 1.0—4 and J 1, with only 2½ diopters of astigmia. The secondary operative procedures performed on this iris were greatly facilitated by the presence of the corneoscleral suture.

Discussion. Dr. Sanford Gifford em-

phasized the value of the corneal suture. He had always favored the old-fashioned Kuhnt flap that was pulled down from outside, but in certain cases there was a little subconjunctival prolapse after healing which annoyed the patient, although it did not interfere with good vision. With the corneoscleral suture this does not occur. There is something to be said for dissecting the conjunctiva first, as in making a sliding flap. It is easy to bring the incision out in the right place, and the scleral suture can be placed more accurately without interference of the conjunctiva. Should the suture be cut, there is a conjunctival flap that can be used to close it afterward. If the flap is left loose, the eye will turn up under the flap and the result will be good. As Dr. Moncreiff said, a Verhoeff operation cannot be performed without an iridectomy, but this series at County Hospital has been very successful and the round pupil looks satisfactory.

Dr. Harry Woodruff said that during the past few years he had almost discarded both speculum and lid retractors. The upper lid is elevated by two sutures placed through the border. After the extraction is completed, the ends of these threads are fastened to the cheek. Naturally, this prevents the patient from opening the eye under the dressing. To some extent also it lessens the need of wound sutures, although these should not be abandoned. This procedure is not new; it was called to his attention recently by Dr. Dunlap of Anaconda. Prolapse or threatened prolapse of vitreous is well controlled by the assistant who holds the threads.

Vitreous prolapse can in large measure be prevented, in cases of high arterial tension or intraocular tension, by the use of avertin anesthesia. Blood pressure of over 200 mm. Hg can be reduced to normal, as also can glaucomatous tension as high as 60 mm.

Dr. S. G. Higgins showed needles obtained in England, with sutures clamped to the needle, forming an atraumatic suture. These are obtained in a sterile glass tube, in oil. The thread pulls more smoothly when preserved in an oily substance, and the needle can be more easily inserted in the cornea.

It may be that the pendulum in favor of operating on immature cataracts will swing too far. The less mature the cataract, the more frequent the complications. It might be wise to be old-fashioned and let the lens mature, not to operate too early.

Dr. Vernon Leech said that on Dr. Allen's service at the Eye and Ear Infirmary, about 200 corneal sutures of various types had been performed, and the one described by Dr. Moncreiff was very well liked. Sutures are usually removed on the tenth day, but some accidents have occurred during their removal. The anterior chamber collapsed in three cases, due to sudden movements of the patients, and one eye was lost as a result of infection that entered through the wound. Recently, to avoid these accidents, a small Kuhnt flap from the limbus has been dissected up, and after the corneoscleral suture is made, both ends are brought through the flap. Following delivery of the lens the suture is tied, leaving a pad of conjunctiva between the wound and the suture, so that there is less danger of opening the wound or damaging the cornea when the suture is removed.

Dr. Thomas D. Allen said, in reference to the case cited by Dr. Leech in which the eye was lost, that his impression was that the infection was introduced by forceps or scissors at the time the suture was removed. The anterior chamber was not opened, but the infection followed the suture tract rather deeply into the cornea and consequently resulted in a very deep abscess of the cornea which rapidly pro-

gressed into the anterior chamber. One point, and this seems to present an objection to the corneal suture, is that the corneal needle is rather thin and small and is quite likely to break in inexperienced hands. However, in general, it gives satisfactory results.

Dr. D. C. Orcutt said that he was glad that Dr. Moncreiff advocates the irrigator. Its use was stopped several years ago at the Infirmary following some cases of keratitis, but he has used it since taking up the bridge operation. This operation requires no suture. So far there have been no accidents. Quite a number are performed leaving a round pupil, and he saw no occasion for using a suture. The lid suture mentioned by Dr. Woodruff is an excellent aid in controlling the lids during the operation, and keeps the eye nicely closed in dressing.

Dr. William F. Moncreiff (closing) said, with reference to the patients shown, that in 21 of the 23 cases from Cook County Hospital the operation was performed entirely or in the main by the senior resident, assisted and supervised only by the attending surgeon. These operations represent part of the work of three successive residents over a period of some 15 months. These cases were in unselected patients, comprising approximately two thirds of those operated on by this technique during this time. It should be evident that such results are attributable to the method rather than to the special skill of any one operator.

He appreciated Dr. Woodruff's suggestion concerning avertin narcosis, and also the substitution of lid sutures for blepharostat or lid retractors. These measures should have special value in selected cases, especially in the intracapsular type of operation. So far no special difficulty had been encountered in removal of the suture. It is usually necessary, however, to employ rather meticulous care in the procedure. The suture should be left in for at least nine or 10 days or even for two or three weeks, if there is any special reason for it. In placing the suture at the beginning of the operation, care must be taken to avoid entering the needle too far from the limbus.

Retinal detachment in aphakic eye

Dr. B. R. Sakler presented a white man, 56 years of age, from Dr. Thomas D. Allen's service at the Illinois Eye and Ear Infirmary. He was admitted with a history of failing vision in the left eye of one week's duration. He had had an injury to the right orbit in 1924, with resultant blindness in that eye within one year. An intracapsular lens extraction by the Verhoeff technique was performed by Dr. Allen and the resulting vision was 20/30.

Five weeks after operation the vision was down to 10/200. A large retinal detachment above accounted for the vision; no retinal tear was found.

The patient was kept flat on his back under observation for two weeks with no improvement. Operation was then performed for retinal detachment. A barrage of diathermy punctures, one half the thickness of the sclera, was laid down with the Gradle needle, 22 mm. from the limbus, arranged in three rows encircling the area. Ten days later there was a partial reattachment and definitely enlarged lower visual field. The patient remained in bed for six weeks and wore pinhole goggles after the first week. He was discharged 10 weeks after admittance, having excellent fields and 20/30 vision.

Fundus photographs in natural colors

Dr. Robert Von der Heydt presented a series of the first fundus photographs in natural colors using the new Kodachrome film.

PARACENTESIS AND ATROPINE IN THE TREATMENT OF OPTIC AND RETINAL ATROPHIES

DR. M. L. FOLK read a paper on this subject which was published in this Journal (May, 1937).

Discussion. Dr. Hallard Beard said that since Dr. Folk had prepared this paper, Dr. Lauber of Warsaw had published one on the same subject in the Archives of Ophthalmology, in which the principles are the same. In consideration of optic atrophy three conditions must be kept in mind as possibilities: In a case in which there is a 50-percent loss of vision or 50-percent loss of the visual field, the possibility is that half the fibers are normal, half are dead. Obviously a complete recovery cannot be expected. It may be arrested, but our therapy cannot contemplate conservation of more than half the vision. There is also the possibility of 50-percent atrophy existing as a state of toxicity or maiming of all the fibers, none dead, but in various stages of decay or intoxication. Here the outcome could be complete healing. The third possibility is a mixture of the other two, a few dead fibers, a few quite normal fibers, and a considerable number that have passed into a state of decrepitude or are in a sort of transitory state. The last named is probably the true one in most cases of partial optic atrophy.

Optic atrophy is progressive because circulation of blood in the optic nerve, the retina, and perhaps in the choroid is slowing down. Therapy must be directed toward improving the impoverished circulation of the retina. This may be done, generally, by increasing the general systemic blood pressure. The methods for its accomplishment are well known: changes in diet and a regime that improves the general vascular tonus. But it is almost impossible to increase the blood pressure for any length of time without causing other damage. Many drugs will increase heart action. Many heart stimulants will increase blood pressure at the expense of the general blood flow; that is, elevate the blood pressure by increasing the resistance to general circulation. Atropine increases the heart action, blood pressure is slightly increased, and there is a dilatation of the capillary circulation or peripheral circulation; but it is not certain that this vasodilation occurs in the eyeball. Certain drugs act upon the smooth muscle of the blood vessels locally and the neuromuscular junctions. Dionin causes the eye to become red very rapidly, and this is followed by an influx of fluid into the tissues. Evidently there is an increase in size of the blood vessels on the surface of the conjunctiva. We know of one unfailing means of increasing local blood circulation—the application of heat locally.

Intraocular blood pressure is opposed by the intraocular tension, and if it can be relieved of that counterpressure much can be accomplished in improving the circulation within the eye. We know of many drugs that will lower glaucomatous hypertension, but there are few which will lower normal intraocular pressure. This seems rather fallacious, in view of our knowledge of the mechanism and the newer theories acting upon intraocular pressure. We feel that miotics, such as pilocarpine and eserine, act upon the blood vessels themselves, in constricting the walls of the arterioles and diminishing their permeability. Therefore, in instilling such a drug, we may make the eyeball soft, but we bring about in the blood vessels the opposite effect from that which we wish to produce. The blood vessels are constricted, and the inflowing blood is diminished, as is capillary permeability. There are other methods of softening the eye without drugs, by massage, for instance. Other drugs cause a different effect on intraocular pressure—cocaine will soften a normal eye, adrenalin also, but the latter produces an adverse effect on

blood vessels, other than that desired for treatment of optic atrophy.

Finally, there are operative measures for lowering the tonus of the eye. The simplest is paracentesis, which is probably the least satisfactory because its effect is transitory. When the eyeball is punctured, fluid escapes, the wound closes, the pressure builds up again, but goes on climbing beyond the point where it originally was, and hypertension may follow. Other operations act in various ways—iridectomy, iridotasis, iridencleisis—probably by providing a wick from the inside of the eye to the subconjunctival space; cyclodialysis probably allows egress of fluid from the ciliary body to the subchoroidal spaces.

The whole question presents an attractive problem for research—the means of increasing the impoverished blood circulation on the inside of the eye, to the end that some diseased nerve fibers may be resuscitated, thereby conserving vision or bringing about improvement.

Dr. Frank Brawley asked whether Dr. Folk had considered the use of syntropan (Roche) which is much less toxic than atropine and can be used in larger doses. He also suggested that in the attempt to increase circulation, intraorbital injections of acetylcholine might be tried.

Dr. M. L. Folk (closing) said that inasmuch as this is a preliminary report, he did not go into the theoretical considerations of the work. With reference to Dr. Beard's remarks, he wondered how we could tell whether half the fibers were entirely destroyed or all the fibers partially destroyed. All we can say is that a patient has so much vision and decide whether it is early atrophy, fairly well advanced, or much advanced.

While the principle of Dr. Lauber's treatment is the same, by increasing the circulation of the optic nerve and retina, there still remains the question of method —pilocarpine will not reduce the tension of the normal eye. It is doubtful if cyclodialysis will reduce it more than from two to seven points, which does not mean a great deal. Dr. Lauber used strychnine for raising the blood pressure, but atropine will do the same. It stimulates the nerve centers but paralyzes the nerve endings. Thus it hastens the action of the heart by paralyzing the neuromuscular junctions of the vagus distributed to it. At the same time by stimulating the vasomotor centers it constricts the arterioles and dilates the capillaries. It does produce a hyperemia. Paracentesis is only a temporary measure, but during the first two weeks repeated paracenteses will ensure a good start in treatment. There is probably something to the point that paracenteses by repeatedly changing the aqueous have some beneficial effect from a metabolic standpoint on the nerve and retina. One iridencleisis was performed in retinitis pigmentosa, and the tension decreased three points and then went up again.

In reply to Dr. Brawley, he had not heard of synthetic atropine. In regard to acetylcholine, he said that reports are coming in from various clinics but the results are nil. In the July, 1936, issue of the American Journal of Ophthalmology there is an abstract concerning retrobular injections of atropine with some benefit; 1/100 solution was used.

In this series, an effort was made to check up on the work of Dr. Galengo who reported improvement in 75 percent of cases, but the results here were much less favorable. We should continue the effort to do something for these patients. Even if they do not permanently retain their vision, a temporary improvement, if only for a year or so, will be of benefit.

Corneal dystrophies (types)

Dr. Robert Von der Heydt read a paper on this subject which is published in this issue.

Robert Von der Heydt

SAINT LOUIS OPHTHALMIC SOCIETY

November 19, 1936

DR. LAWRENCE T. POST, *presiding*

CLINICAL STUDY OF ANISEIKONIA

DR. GUERDAN HARDY read a paper on this subject which was published in this Journal (June, 1937).

Discussion. Dr. L. Post said that he has been much interested in this paper and this subject. Dr. Hardy has worked five afternoons a week for about two years in this field. He has studied only 34 cases in this time, which gives a good indication of the care he has given to each. Many clinics accept the findings of just one short afternoon's work.

He is very much in doubt about this whole subject. We are trying to conduct this clinic as a study and not as a mill to turn out eikonic prescriptions. The cases in which we have had success have been so remarkable it is hard to discount them. Most of these patients Dr. Post has known personally; he believes 10 of them have come from his office. Whether the results are only psychic he does not know. Most of these patients have been of the most difficult type—always those whom we have been unable to help with refraction or orthoptic training. One of them had consulted four ophthalmologists. Many of them are neurasthenic. The fact that equal aniseikonia could exist in two persons and produce symptoms in only one of them is no argument against aniseikonia as a cause of trouble, for a similar state of affairs in errors of refraction is well known. Dr. Post asked Dr. Hardy if he thought the correction of aniseikonia worth while. We haven't much real knowledge on this subject but he believes that we should continue its study, though he is not yet entirely convinced of the utility of it.

Dr. Guerdan Hardy, in closing, answered that by all means the work should be carried on in the same way as in the past two years. Some of the patients were definitely benefited. The first results were often discouraging and repeated changes were sometimes needed before benefit was obtained. Some of the patients were examined five or six times and some more.

Dr. L. Drews had asked whether any of the patients benefited with one eye closed. In two of the cases there was a history of reading first with one eye and then the other.

HISTOLOGIC FINDINGS IN RETINAL DETACHMENT TREATED WITH MULTIPLE DIATHERMY PUNCTURES

DR. J. M. KELLER read a paper on this subject.

Discussion. Dr. Harvey D. Lamb said that not a great many histological examinations had been made on eyes operated on for detachment. The internal layers of the retina are but little affected. The return of vision that has been reported seemed to him quite wonderful. Professor Lindner reported the return of vision in 103 cases. The retina degenerates rapidly in enucleated eyes, so it must be that the nutrition of the retinal layers is maintained through the subretinal fluid, otherwise after two or three months one could not get normal vision.

SIMPLE CHRONIC GLAUCOMA REVEALED BY HOMATROPINE REFRACTION

DR. J. A. FLURY read a paper on this subject.

H. Rommel Hildreth,
Editor.

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ORBITAL INFLAMMATIONS

Toward its base the orbital pyramid is so nearly filled by the eyeball that the space intervening between the globe and the bony socket is simply adequate to permit of the necessary ocular movements and of the presence of the thin muscular insertions and a few blood vessels and nerves, with the necessary supportive fascia. Since the eyeball protrudes appreciably beyond the base of the orbital pyramid, the equator of the eye lies for the most part only a short distance behind the orbital rim.

In the presence of orbital edema, whether inflammatory or noninflammatory, most of the opportunity for infiltration of fluid lies behind the globe, in the apex of the orbit. This region, which contains the optic nerve and other important structures, is inaccessible to inspecton or palpation.

Exploratory incisions can hardly enter this space effectively without grave danger to the posterior orbital contents; and there can be no question that such incisions have frequently been responsible for permanent damage to the organ of vision, or for spreading widely an infective process which might have remained more or less harmlessly localized.

Apart from occasional extension to the orbit of disease processes originating in the eyeball, orbital edema or actual infection may arise by contiguity from the cranial cavity, from the lacrimal apparatus, from the maxillary antrum or the frontal or especially the ethmoid sinus, or from infections of the lids or face. Through more remote relationships, or-

bital inflammations may result from dental, aural, or throat disorders.

The thinness of the lamina papyracea (0.2 to 0.4 mm.) is particularly responsible for danger arising from the ethmoid sinus. This is especially true in young children, in whom orbital edema, commonly accompanied by conjunctival chemosis, develops quite easily in the presence of the ethmoid complications associated with influenza, infections of the tonsillar ring, and the common exanthemata.

Orbital edema may be merely the preliminary expression of a disorder which will later amount to actual infection and inflammation, or it may be merely a fugitive expression of inflammation in a surrounding structure. It is very important to remember that orbital swelling may occur without actual inflammation in the orbital cavity, for in such a case surgical intervention is not simply uncalled-for but harmful and dangerous. On the other hand, the presence of extreme edema of the conjunctiva and eyelids often renders doubtful the diagnosis as between simple edema and an infective complication, by concealing the true situation as to the existence of exophthalmos, as to vision, and even as to the amount of deep tenderness.

All in all, accurate diagnosis of what lies beneath the swelling of orbital tissues is often extremely difficult and uncertain. But whereas conservative and expectant treatment may be necessary, it is possible for management of the case to err dangerously in this direction.

Holger Ehlers, of the University of Copenhagen, having been called upon to write a chapter on orbital affections for a Scandinavian manual of ophthalmology, decided to undertake independently a modern review of the orbital inflammations. This has recently been published as a special supplement to Acta Ophthalmologica (Supplement 12, 1937). The monograph has been translated from the author's Danish into language which is not always idiomatic, but the meaning is clear, and the 123 well-printed pages may be expected to serve for some time as the most complete statement of the subject in the English language.

Inflammation is practically never primary in the orbit. The variable clinical pictures presented, and the frequent vagueness of demarcation of one from the other, have given rise to some confusion of terminology. The cases of actual infection have been described under the titles "orbital phlegmon," "orbital cellulitis," "orbital thrombophlebitis," and "orbital abscess."

To the cases of orbital edema and swelling secondary to adjacent infections, but without actual presence of infection within the orbit itself, Ehlers applies the name "collateral orbital edema." He accepts "orbital phlegmon" for the condition in which infection has invaded the loose orbital tissue. It is essential to distinguish such infections from those in which the active process, although within the bony orbit, lies outside the orbital periosteum or in front of the orbital septum. Here one is dealing with subperiosteal or preseptal abscess.

So-called serous or rheumatic tenonitis, an unusual and somewhat disputed complication of grippal or sinus infections, requires conservative management analogous to that accorded to "collateral orbital edema." Orbital edema or cellulitis must also be distinguished from thrombosis of the cavernous sinus, but the development of the latter is so dramatic, and the symptoms so intense (high temperature, terrific headache, disturbance of cerebration, limitation of ocular movements, and reduction of vision) that a mistake should not easily occur.

The thirty-five case reports in Ehlers's monograph include sixteen cases of collateral orbital edema, eleven of sub-

periosteal abscess, and eight of orbital phlegmon.

The conjunctival chemosis in cases of collateral edema was usually accompanied by redness, although the edema was sometimes pale. In such cases it is not infrequent to find the edematous conjunctiva overhanging the cornea, or even protruding between the eyelids. The exposure, sometimes with incidental erosions, may give a misleading impression of severe conjunctivitis. In dealing with young children, with their frequent inability to furnish clear answers to diagnostic questions, importance is to be attached to the fact that their complaints and reactions are rather such as belong to a sensation of tension and discomfort than such as would imply positive pain or severe tenderness. Whatever reduction in motility of the eyeball is found with "collateral edema" is general and diffuse, and any tendency to distinct localization in this regard would indicate a more serious condition.

Vertical or lateral displacement of the eyeball should positively suggest the presence of a subperiosteal abscess. Exploratory puncture may seem advisable in such an instance, yet the result is frequently disappointing, so that exploratory punctures are definitely condemned by Birch-Hirschfeld. X-ray films are commonly of little value, except as pointing to related involvement of the nasal sinuses.

Ehlers agrees with Birch-Hirschfeld that, once the presence of periosteal abscess has been positively diagnosed, the best approach is by way of an incision five or six centimeters long at the orbital margin over the supposed site of the abscess. The aim must be to push the periosteum aside with a blunt instrument and without injury to the periosteum itself. If the abscess is found and evacuated, a drain is to be inserted.

Since orbital phlegmon almost always occurs in association with a causative infection outside the orbit, it is difficult to decide whether such general symptoms as fever, nausea, and vomiting are due to the formation of pus in the orbit or to the underlying factor. Symptoms related to involvement of the ciliary ganglion (corneal anesthesia and pupillary disturbances) have been described, but their value for early diagnosis is questionable. The same may be said of such disturbances of the visual field as have been mentioned as indicating involvement of the optic nerve.

The seriousness of true orbital phlegmon is sufficiently indicated by the fact that three out of eight such cases in Ehlers's material proved fatal. The usual recommendation of large, deep incisions of the phlegmonous tissue seems justifiable in the presence of a positive diagnosis. Birch-Hirschfeld feels that he has saved life in such cases by orbital exenteration—a heroic remedy from which most surgeons would shrink except in the presence of intracranial complications. Also recommended for orbital phlegmon are serum therapy and the application of a suction apparatus over an incision along the orbital border.

Unfortunately, much of the advice given with regard to orbital inflammations presents some analogy to the ancient counsel as to catching a bird by putting salt on its tail, and one wonders whether any amount of writing and any amount of experience offer reasonable assurance that such patients can be given proper treatment at the right time.

The diagnosis is often uncertain until the patient either begins the road to recovery or gives promise of an early demise. Yet on the one hand we are admonished as to the frequent danger of action before the diagnosis is established, and on the other hand we are given positive recommendations for urgent measures which are only to be applied in the presence of diagnostic certainty. Too

often, in orbital phlegmon, accurate diagnosis first becomes possible on the autopsy table. W. H. Crisp.

THE A.M.A. AT ATLANTIC CITY

The activities of the week began for some in Philadelphia, where an examination was conducted by the American Board of Ophthalmology. Approximately 55 examinations have now been held and between 1,300 and 1,400 ophthalmologists have received certificates.

Breakfast was served at the Warwick Hotel, after which instruction was given to examiners as to procedure. From there the examiners went to the Wills Hospital, where they met some 44 candidates. Except for a noon intermission the examinations continued until four o'clock, at which time a discussion of the candidates and their grades was held. Without knowing the exact results one received the general impression that those presenting themselves were for the most part well prepared and that probably not more than 10 percent would be rejected. This is a low percentage compared to that of some of the other boards, one of which rejected 38 percent of approximately 65 candidates. The longer the experience with the Board the better the idea seems. It certainly has raised the standards of ophthalmologists and proved a very constructive factor in our specialty.

To those who had not visited the Wills Hospital previously this examination provided opportunity to examine this wonderful institution. Conceived with vision and executed with discrimination it presents one of the best ophthalmic plants in the world. The management is able, and the work turned out of the highest type.

Tuesday found interest centered in the meeting of the Research Society held in the Game Room of the Hotel Marlborough-Blenheim. Many excellent papers were presented, all of which will appear during the fall in this Journal. A special feature was the presentation after the buffet luncheon of the Dana medal for accomplishment in the prevention of blindness to Mrs. Winifred Hathaway of the National Society. Dr. Park Lewis made the presentation, which was acknowledged by Mrs. Hathaway in a very graceful speech of acceptance.

Wednesday witnessed the first day of a very interesting scientific session. Several of the mornings were occupied by the members in viewing the scientific exhibit. It was surprising how many were interested in the ophthalmological division. As always, the moving pictures drew the largest crowds. The 20 or 30 chairs for visitors were constantly filled while others stood in the rear. Undoubtedly this method is a very important one in teaching. Still further utilization of it must be made. There is a tendency for the use of color to be carried a little too far in some cases in which valuable detail is sacrificed. In disease conditions, however, color is important. Those responsible for this exhibit should be congratulated and sincerely thanked.

Turning to the legislative sessions—perhaps the most vital feature of the A.M.A.—the New York delegation threw somewhat of a bombshell into the meeting when they made certain proposals with regard to state medicine. The method of presenting the subject was unfortunate. The basic ideas were not those of the New York delegates alone, but of a nation-wide group which had to bring the proposal before the executive session through some such body. Another and greater misfortune was that the basic ideas were decidedly changed in presentation. These principles and proposals, signed by about 150 representative physicians, were as follows:

PRINCIPLES

1. That the health of the people is a direct concern of the government.

2. That a national public-health policy directed toward all groups of the population should be formulated.
3. That the problem of economic need and the problem of providing adequate medical care are not identical and may require different approaches for their solution.
4. That in the provision of adequate medical care for the population four agencies are concerned: voluntary agencies, local, state, and federal governments.

PROPOSALS

1. That the first necessary step toward the realization of the above principles is to minimize the risk of illness by prevention.
2. That an immediate problem is provision of adequate medical care for the medically indigent, the cost to be met from public funds (local and/or state and/or federal).
3. That public funds should be made available for the support of medical education and for studies, investigations, and procedures for raising the standards of medical practice. If this is not provided for, the provision of adequate medical care may prove impossible.
4. That public funds should be available for medical research as essential for high standards of practice in both preventive and curative medicine.
5. That public funds should be made available to hospitals that render service to the medically indigent and for laboratory and diagnostic and consultative services.
6. That in the allocation of public funds existing private institutions should be utilized to the largest possible extent and that they may receive support so long as their service is in consonance with the above principles.
7. That public-health services, federal, state, and local, should be extended by evolutionary process.
8. That the investigation and planning of the measures proposed and their ultimate direction should be assigned to experts.
9. That the adequate administration and supervision of the health functions of the government, as implied in the above proposals, necessitate in our opinion a functional consolidation of all federal health and medical activities, preferably under a separate department.

Had the proposals been circulated a bit more among the profession and their fundamental purpose better understood, they might have been presented more in accordance with the original intent and might have been given a better reception. Because of the partial rejection of the New York delegation's proposals, Mr. Lewis, the senator from Illinois, appeared before the House of Delegates and stated among other things that the time-honored relationship of physician and patient was a thing of the past and implied that the medical profession must coöperate with the Government or matters would be taken out of its hands, to which latter point the House of Delegates had already agreed.

Most physicians wish neither state nor government control of medicine, but it is obvious that the Government has a very real interest in medicine, since, for example, many of the hospital beds are occupied by those directly or indirectly in public pay and since the hospitals containing these patients are managed and staffed by many who are in government or state pay. Since this is so and the Government's attitude is now paternalistic in all matters pertaining to the financially unfortunate, naturally it is going to insist on a voice in directing policy and performance. It seems better that the doctor should aid in directing rather than be directed from without. The Government is preparing to demand adequate care of the sick. The important point is the question as to what this is to comprise. The physician thinks that an essential is the education of the physician and that the problem is not primarily one of good social service but of good medical service. That these problems can be better answered by the doctor than by anyone else we believe, but unless we coöperate with the Government we shall surely be subjected to lay direction and the evils of health insurance and other similar follies will be forced upon us.

For the Section on Ophthalmology Dr.

Parker Heath was chosen chairman and Dr. Derrick Vail the new secretary to replace Dr. Heath. Having had a look at the Atlantic this year we are to have a look at the Pacific next year. San Francisco is a beautiful city and we all want to see the new bridge across the Golden Gate, so let us plan to turn out to help make the Western meeting as big a success next year as the Eastern was this year.

Lawrence T. Post.

BOOK NOTICES

A HAND-BOOK OF OCULAR THERAPEUTICS. By Sanford R. Gifford. Edition 2, Clothbound, 341 pages, 60 engravings. Philadelphia, Lea & Febiger, Price $3.75.

This is a second edition of one of the most popular books on ophthalmology published in recent years. The new edition is about one third larger than the first. It contains numerous additions to previous chapters as well as more illustrations. For the beginner the book is invaluable, and even the experienced ophthalmologist will find much that is new and interesting. The author is justly skeptical of radical, new procedures and views without enthusiasm many of the recent treatments urged by their proponents. Although lack of enthusiasm may discourage some from trying these new suggestions, at least the author will have fewer regrets than if he wrote with more enthusiasm about them.

He has quite properly advocated only generally accepted drugs and procedures. The chapter on physical therapy is deserving of special commendation, as is also that on protein therapy. The present studies on vitamin therapeutics are brought up to date. The chapter on disorders of the muscular apparatus is rather too short to be more than suggestive. Obviously it is not possible to consider this complicated subject deeply in 15 pages.

The book is entertaining and well written; it is easily read. One is tempted to read the entire book instead of using it merely for reference. It is highly and unhesitatingly recommended.

Lawrence T. Post.

SOCIÉTÉ BELGE D'OPHTALMOLOGIE. Bulletin No. 74. Paper cover, 270 pages. Illustrated. Published by the Society, 1936, Bruxelles.

The Belgian Ophthalmological Society held a special meeting in connection with the International Exposition, held at Brussels in September, 1935. This volume gives the papers presented at that meeting, and the discussions thereon. The leading topics were the "Ocular lesions and disturbances associated with renal disease" and "The relations of the hypophysis to visual impairment." There are also papers and case reports presented at the regular meeting of the Society in November.

To one who reads French these Transactions are distinctly interesting; and they present more of practical importance than appears in the proceedings of many of the ophthalmological societies of continental Europe. Glaucoma and detachment of the retina come in for attention, and there is an interesting account of the first sight-saving class established in Belgium. In spite of the increase and improvement of journals devoted to ophthalmology, the transactions of the societies continue to serve the needs and convenience of their members. They also exert an important influence in promoting the self-education of those who thus recorded the more important of their cases and observations.

Edward Jackson.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Mutch, J. R. **The pupil after cervicothoracic sympathetic ganglionectomy: photographic observations in man.** Edinburgh Med. Jour., 1936, v. 43, n. s., Dec., p. 743.

Photographic observations of six patients show that in man the position of the eyeball is unaltered after sympathetic denervation. Narrowing of the palpebral fissure after this operation is due to raising of the lower lid as well as to drooping of the upper lid. After operation the pupil still responds to variations in illumination.

Edna M. Reynolds.

Portohese, G. **Oculocardiac reflex and glycoregulation.** Arch. di Ottal., 1936, v. 43, May-Nov., p. 181.

Studies were made of the behavior of arterial and venous glycemia in relation to the oculocardiac reflex in eighteen healthy young persons. The theory is advanced that hyperglycemia gives stimulation of the sympathetic-adrenal apparatus. H. D. Scarney.

Wiener, M., and Alvis, B. Y. **The use of concentrated epinephrin preparations in glaucoma, iritis, and related conditions.** Amer. Jour. Ophth., 1937, v. 20, May, pp. 497-504.

8

GLAUCOMA AND OCULAR TENSION

Baratta, O. **The behavior of intraocular pressure after paracentesis of the anterior chamber in eyes with normal pressure, in chronic simple glaucoma, and in anterior uveitis with hypotension.** Arch di Ottal., 1936, v. 43, May-Nov., p. 211.

The author followed the behavior of intraocular pressure after paracentesis of the anterior chamber in 27 individuals, some affected by cataract with normal tension, some by chronic simple glaucoma, and some by anterior uveitis with hypotension.

In all three types there was immediate lowering of pressure after escape of aqueous, followed by a rise to higher than the initial reading, and later by decrease in pressure below the normal reading. The normal was restored in a day or two. H. D. Scarney.

Butler, T. H. **Trap-door iridectomy and iridencleisis.** Trans. Ophth., Soc. United Kingdom, 1936, v. 56, p. 194.

The operation is started as for a trephine operation, the disc is cut on the slant, and at the last the trephine is inclined toward the chin and the disc left with a hinge. The prolapsed iris is drawn out and cut with scissors and the disc hinged back into place like a trap

door. The conjunctival flap is sutured in the usual manner.

The technique of the iridencleisis operation for glaucoma simplex is given. In after treatment early massage is emphasized. Of 44 operations 41 were shown successful at final examination.

Beulah Cushman.

Cattaneo, Donato. **Hypertensive iridocyclitis.** Boll. d'Ocul., 1936, v. 15, Nov., pp. 1115-1141.

The writer divides iridocyclitic processes into three groups. The first includes cases in which the hypertension preceded the inflammatory process. Miotics are to be used in these cases, or dionin and adrenalin if synechiae are present. In the second group the hypertension manifests itself at the same time as the inflammatory process. These cases are treated with mydriatics and paracentesis or with dionin and adrenalin. The third group includes cases in which hypertension results from iridocyclitis. These cases are treated with iridectomy, trephining, sclerotomy, or sclerectomy. The writer mentions the different theories as to the mechanism by which the inflammatory process gives rise to intraocular tension. A few clinical cases are reported. (Bibliography.)

M. Lombardo.

Weeks, W. W. **Ocular hypertension in glaucoma.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th annual session, p. 100. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 92.)

Wiener, M., and Alvis, B. Y. **The use of concentrated epinephrin preparations in glaucoma, iritis, and related conditions.** Amer. Jour. Ophth., 1937, v. 20, May, pp. 497-504.

9

CRYSTALLINE LENS

Csillag, F. **Dynamic factors in intracapsular cataract extraction.** Zeit. f. Augenh., 1937, v. 91, Feb., p. 158.

An analysis of the physicodynamic factors in intracapsular extraction of the lens. The author favors tumbling the lens rather than sliding it out, because fewer zonular fibers are stretched at one time and so the chances of injuring the capsule are decreased.

F. Herbert Haessler.

Csillag, F. **Suggestions for a new operative technique for tearing the zonular fibers and for removing the lens intracapsularly by tumbling it.** Zeit. f. Augenh., 1937, v. 91, Feb., p. 171.

To prevent vitreous loss the author opposes traction on the zonular fibers (produced by capsule forceps of his own design) with traction by a mouse-tooth forceps for grasping the sclera. The direction of traction on the lens is so designed as to break a small number of zonular fibers at one time.

F. Herbert Haessler.

Elschnig, H. **The intracapsular cataract operation in country practice.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 191.

The preoperative procedures and mode of operation are described in detail. In all cases, after closure of the conjunctival sutures the anterior chamber is filled with sterile air injected with a hypodermic syringe and blunt tear-sac cannula, which is tolerated without irritation, even if the air bubble remains visible for from five to eight days. Correct position of the iris without use of a repositor, and repression of the vitreous if prolapsed or bulging into the pupil, are attributed to the injection of air. Even without sufficient assistance or clinical facilities, intracapsular extraction of cataract can be successfully performed.

C. Zimmermann.

Lijo Pavia, J. **Senile cataract.** New medical treatment. La Semana Med., 1937, v. 44, April 8, pp. 989-996.

The author reports ten cases in which he used the treatment suggested by Müller (see Amer. Jour. Ophth., 1937, v. 20, p. 95), namely injection of vitamin C into the anterior chamber, subcutaneously or intravenously. The author regards injection into the anterior

chamber of 0.5 c.c. of a 2.5 percent solution of ascorbic acid (or 0.25 c.c. of 5 percent solution) as absolutely innocuous. He claims successes by various combinations of this line of treatment.

W. H. Crisp.

Moulton, E. C. **Anterior lenticonus.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th session, p. 261.

This is the eleventh true type of anterior lenticonus to be reported in the literature. (4 illustrations.)

George H. Stine.

Müller, H. K. **The influence of phlorhizin upon the vitamin-C content of the lens (the ability to reduce dichlorphenolindophenol).** Arch. f. Augenh., 1937, v. 110, March, p. 321.

Into fourteen rabbits the author injected subcutaneously daily for from 6 to 21 days 0.5 mg. of phlorhizin for every 100 gm. of body weight. The vitamin-C content of the lens decreased from 26.2 to 16.5 mg.; that of the aqueous from 31.2 to 21.2 mg.; and that of the adrenals from 299 to 199.5 mg. per 100 gm. Animals poisoned with sodium fluorid, however, showed an increase in vitamin-C content. Twelve rabbits were fed with the maximally tolerated dose of one mg. per 100 gm. of body weight for from 9 to 12 days. The vitamin-C content of the lens rose from an average of 26.8 to 31.8 mg.; that of the aqueous from 31.2 to 33.1 mg.; and that of the adrenal from 299 to 399.7 mg. Although one is justified in assuming that decrease in vitamin C in animals poisoned with phlorhizin is due to inhibition of resorption of vitamin C through the intestines or to raising of the blood-aqueous barrier, nevertheless the author is inclined to believe that the decrease is rather due to inhibition of vitamin-C production in the lens.

R. Grunfeld.

Süllmann, H. **The carbohydrate metabolism of the lens.** Arch. f. Augenh., 1937, v. 110, March, p. 303.

Investigations carried on by the author prove to him that the lens is able to form phosphoric-acid ester from carbohydrates such as glucose, fructose, manose, and galactose, but not from arabinose. This capacity of the lens plays an important part in lens metabolism, because anaërobic decomposition of the carbohydrates is accomplished by enzymes which act only on phosphoric-acid ester. The phosphor necessary in this process originates partially in the lens itself. The ability to form this ester is diminished in senile and cataractous lenses. While cell-free lens extract and its dry preparation can form the ester with glycogen, the intact lens is not able to do so because glycogen cannot penetrate the lens capsule.

R. Grunfeld.

Wibo, M. **Coloboma of the lens and arachnodactyly.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 14.

Embryologically the interdependence between simultaneous changes of the hypophysis (the hormonal secretions of which exert a considerable influence upon body growth and osteogenesis) and of the lens results from the fact that both elements are of ectodermal origin and are formed by invagination at the same stage. J. B. Thomas.

10

RETINA AND VITREOUS

Asayama, R., and Takagi, A. **The occurrence of lipoid in the pigment epithelium in retinitis pigmentosa.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 162.

A man of 56 years, affected with retinitis pigmentosa but without known hereditary taint, suffered from his twentieth year from hemeralopia and visual disturbances. His right eye became blind from glaucoma simplex in spite of trephining, and was enucleated on account of painful phthisis. The histologic examination showed glaucomatous atrophy of the optic nerve, and intense edema of the choroid, characteristic degeneration of retina and choroid, in the lipoid pigment epithelial cells, free oleic acid, and partly calcified colloid bodies. As the production of visual purple suffers by severe degeneration of the pigment epithelium, this

may be in close relation to the hemeralopia constantly found in retinitis pigmentosa. (Illustrations.)
C. Zimmermann.

Bustamante y Velasco, Miguel. **Some cases of spasm of the retinal arteries.** Anales Soc. Mexicana de Oft. y Oto-Rino-Laring., 1936, v. 11, no. 2, pp. 113-118.

Of the seven cases here described, one had esophageal cancer, one pulmonary tuberculosis, the remainder syphilis. W. H. Crisp.

Coulouma and Lesenne. **Cure of thrombosis of the central vein of the retina following dental extraction.** Arch. d'Opht., 1936, v. 53, Dec., p. 890.

A woman aged 44 years showed the typical picture of thrombosis of the central retinal vein of the right eye. Vision was however 10/10. One week later the vision was 7/10. Physical examination and laboratory tests were negative, except for a carious right upper canine tooth which was extracted. Eight days later the visual acuity returned to normal, and only a few small hemorrhages could be observed in the periphery of the retina. The author concludes that the thrombosis was of dental origin. (Bibliography.) Derrick Vail.

Csillag, Franz. **A case of cured scleritis complicated by retinal detachment.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 206.

The detachment commenced at a place corresponding to the scleritic focus, moved downward, and subsided with progressive improvement of the scleritis. C. Zimmermann.

Folk, M. L. **Paracentesis and atropine in the treatment of optic and retinal atrophies.** Amer. Jour. Ophth., 1937, v. 20, May, pp. 511-516.

Fritz, M. **Transitory change of pulsation of the retinal artery.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 50.

In a patient whose retinal arteries were very elastic, the author observed for twenty days almost complete disappearance of arterial pulsation in one eye, although the blood continued to circulate through the vessel at a constant pressure of 80 mm. of mercury. Treated with vasodilators, this anomaly, probably due to incomplete spasm ahead of the retinal artery, ceased and was replaced for twelve days by hypertension as related to the retinal pressure of the other eye. J. B. Thomas.

Fuchs, A. **Retinal cysts and the genesis of retinal holes.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 145.

According to Fuchs there is no essential difference between retinal cysts and cleavage of the retina in the intermediate granular layer, as in both an increasing accumulation of fluid takes place. Two cases are described in which large cysts in spite of long existence did not lead to detachment of the retina. Formation of cysts and cystic degeneration are principally distinguished. The cysts by active accumulation of fluid produce bulging of the retinal walls inward or outward. Generally they do not occur at the extreme periphery. The typical senile cystoid degeneration commences at the ora serrata and consists of gaps in the tissue due mostly to atrophy and passive accumulation of fluids. As a rule, holes in the fovea are due to cystoid degeneration, but stretching of the retina in highly myopic eyes may also be a cause in rare instances, especially if found on both sides of a vessel. An illustrative case is reported. Probably other causes or their combinations may be found by closer clinical and pathologic study. (Illustration.) C. Zimmermann.

Greeves, R. A. **Detachment of the retina with vitreous hemorrhages.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 148.

The author describes five cases in which sudden loss of vision resulted from vitreous hemorrhage, after clearing of which a detachment of the retina was found. In all cases a retinal vessel was found either crossing the retinal tear or disappearing at its edge. It is suggested that some abnormality of the retinal vessel may be a factor, but the author was unable to prove it.

All cases with retinal separation responded satisfactorily to operative treatment, at least for a time.

Beulah Cushman.

Neame, Humphrey. **A method of estimating the caliber of retinal vessels in the living eye by means of the ophthalmoscope.** Trans. Ophth., Soc. United Kingdom, 1936, v. 56, p. 155.

The author presents an ophthalmoscope with a graticule showing lines of varied thickness, the shadows of which when projected on the fundus give correct measurements of the widths of the retinal vessels. The normal arteries averaged under 0.1 mm. in diameter, the veins 0.1409 mm., the optic disc between 1.42 and 1.76 mm.

Beulah Cushman.

Pagani, Mario. **A simple aid in diathermic treatment of retinal detachment.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 210.

Strampelli's method, used in Italy, is described. The diathermophanoscope consists of a simple transillumination cone which concentrates the light on the tear. At the base of the cone is a contact ring with which the active pole of the diathermic apparatus is connected. The second pole is placed on the body of the patient. The operator locates the tear with the electric ophthalmoscope, directs the light of the cone to it, and by a foot switch closes the diathermic current by which the coagulation is effected. The instrument is manufactured by Trelleani and Formaciari, Milan, Italy. (Illustration.)

C. Zimmermann.

Paula-Santos, B. **Traumatic hernia of the vitreous in the form of a sac in the anterior chamber, and considerations on the limiting membrane of the vitreous.** Arch. d'Opht., 1936, v. 53, Dec., p. 876.

Vitreous hernia can be classified in three groups: (1) following intracapsular cataract extraction, with intact hyaloid, of which a part at least corresponds to Cloquet's canal; (2) consecutive to rupture of the hyaloid following discission; and (3) secondary to dislocation of the lens. The author is mainly concerned with this last group, and reports the case of a Japanese man aged 50 years who was struck in the right eye by a piece of wood. Forty-two days later a vitreous hernia into the anterior chamber between the 7 and 11 o'clock positions was observed. It apparently pressed the iris against the anterior lens surface. The importance of the observation is that it supports the evidence of the existence of a limiting hyaloid membrane, as in cases reported by Hesse and Elschnig. (Illustration, bibliography.)

Derrick Vail.

Renard, G. **Retinal hemorrhages in the course of meningeal hemorrhages in the nursling.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n. s., Jan., p. 30.

In pachymeningitis of infants, retinal hemorrhages are found in a half or third of the cases. It is usually thought that these are due to increased intracranial pressure. On the contrary, the author believes that they indicate a congenital vascular alteration, hereditary syphilis being perhaps the etiologic factor. (Bibliography.)

Derrick Vail.

Sobhy-Bey, M. **Detachment of the retina of macular origin and its surgical treatment.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n. s., Jan., p. 40. (See Amer. Jour. Ophth., 1937, v. 20, May, p. 546.)

Walker, C. B. **New methods of galvanic and diathermic treatment of retinal detachment.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th session, p. 265.

Negative galvanism is one of the most important factors in increasing the percentage of cures in cases with macular tears. An iridium-platinum needle is used, 0.006 inch thick, 2 to 3 mm. long, and set at right angles to the end of the narrow insulated shaft. Finer needles (0.004 inch) are supported in a hypodermic needle cannula.

George H. Stine.

Wolf, Eugene. **The effect of quinine on the oxygen consumption of the dog's**

retina. Trans. Ophth. Soc. United Kingdom. 1936, v. 56, p. 162.

The author repeated the experimental work of Goldschmidt, who had concluded that the amount of pathologic change in the retinal tissues could be determined by the oxygen consumption, and had suggested that the method would indicate disturbance of retinal function at a stage when no histologic lesion was yet apparent.

Beulah Cushman.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Cohen, Henry. **Optic atrophy as the presenting sign in pernicious anemia.** Lancet, 1936, v. 231, Nov. 21, p. 1202.

Two cases are reported in which optic-nerve changes were the earliest manifestation of pernicious anemia. Failure of vision had been noted in one case for a year and in the other for eight months. After administration of liver extract, there was immediate improvement in vision. Probably many of the cases of unexplained optic atrophy belong to this group.

Edna M. Reynolds.

Folk, M. L. **Paracentesis and atropine in the treatment of optic and retinal atrophies.** Amer. Jour. Ophth., 1937, v. 20, May, pp. 511-516.

Gonçalves, Paiva. **Diagnostic value of choked disc.** Annaes de Ocul. do Rio de Janeiro, 1936, v. 5, no. 4, pp. 16-23.

Writing in Portuguese, the author reviews the differential diagnosis of conditions in which choked disc occurs, with emphasis on disorders of the anterior and posterior regions of the brain.

W. H. Crisp.

Griffith, J. Q., Jr., Jeffers, W. A., Fewell, A. G., and Fry, W. E. **A study of the communication and direction of flow between cerebrospinal fluid and optic discs in the rat.** Amer. Jour. Ophth., 1937, v. 20, May, pp. 457-461.

Joiris, Fanchamps, and Barrac. **A difficult diagnosis: exophthalmos with eyes fixed and retrobulbar neuritis.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 20. (See Section 13, Eyeball and orbit.)

Schupfer, Francesco. **Acute retrobulbar neuritis with special regard to etiology and diagnosis.** Boll. d'Ocul., 1936, v. 15, Nov., pp. 1142-1175.

After a severe cold a man of 63 years who for a long time had been subject to recurrent attacks of rhinitis became affected by a very large absolute central scotoma in the left field. Vision was reduced to hand movements at the periphery of the field. The fundus was negative. Normal vision was reëstablished after treatment with salicylates. The vision of this eye a few months later, however, was limited to counting fingers at two feet, and the disc was definitely subatrophic. Rheumatic and other etiologic factors of acute optic neuritis are discussed at length and their treatment mentioned. (Bibliography.)

M. Lombardo.

12

VISUAL TRACTS AND CENTERS

Fledelius, Mogens. **Fracture of the skull, meningocele, hemianopsia.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1935-1936, pp. 5-9. In Hospitalstidende, 1936, Dec. 15.

A medical student 24 years of age, while studying physiology, was prompted to examine his own vision and found that he had a complete left-sided homonymous hemianopsia of which he had not before been aware. On investigation, a hospital record of this student was discovered, describing an accidental fracture of the skull in the right occipital region at five years of age. This fracture had been followed by development of a meningocele. In surgical repair of this meningocele at that time, the posterior end of the occipital lobe had been found partly gangrenous.

D. L. Tilderquist.

13

EYEBALL AND ORBIT

Behr, Carl. **The ocular changes in Schüller-Christian-Hand's disease.** Graefe's Arch., 1937, v. 136, p. 403.

This disease is due to disturbance in the metabolism of cholesterin. Its three principal symptoms, present either together or alone, are: (1) an appearance in the X-ray picture of the skull not inappropriately designated as map-like fusion of the bones; (2) a particular form of exophthalmos; and (3) diabetes insipidus from damage to the hypophysis or the basal sympathetic centers. The exophthalmos is usually the first symptom of the disease to be detected. Infiltration of fat in the dura mater and bones of the skull leads to a tumor-like swelling which if it presses upon the orbital contents causes proptosis of the eyeball and if it is located at the sella turcica can produce compression of the hypophysis and its immediate vicinity. More rarely the lipoidosis occurs in the dural sheath of the optic nerve, or in the hypophysis, in its pedicle, or in the vicinity of the tuber cinereum. The clinical findings in two cases are described. Within six months, a three-year-old girl, previously healthy as were also the parents, developed pronounced cholesterin-lipoidosis of the lateral wall of each orbit and also the left side of the superior orbital margin. In the upper lateral part of each cheek there were flat swellings under which the bone was defective. The left eyeball was proptosed and displaced inward and downward. On a diet as free as possible from fats, the swelling in the orbital walls and defects in the bones disappeared within eight months. The second patient was a man of 69 years who had previously been well. The left eye presented a moderate degree of ptosis and exophthalmos with displacement of the globe downward and outward. The diagnosis of a retrobulbar growth under the roof of the orbit was made after a soft, elastic, painless, and nonmovable resistance could be palpated deep between the eyeball and the superior orbital margin. At operation, it was found that the process had extended from the dura, destroying the bony roof of the orbit. Microscopic examination of the bluntly loosened masses showed in part granulation tissue, and in part disintegrated bone and necrotic tissue. Thereafter, the double vision and exophthalmos quickly disappeared. H. D. Lamb.

Clay, G. E., and Baird, J. M. **Restoration of the orbit and repair of conjunctival defects.** Trans. Sec. on Ophth., Amer., Med. Assoc., 1936, 87th annual session, p. 252. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 105.)

Gialho, Abreu. **Remarks on localization and action of the staphylococcus in the eye and its adnexa.** Anales de Ocul. do Rio de Janeiro, 1936, v. 5, no. 4, pp. 9-15.

The patient was a male library assistant aged 25 years, with extensive facial acne. Severe edema of the left upper lid extended on to the face, there was severe pain on pressure with the finger at a definite point in the supraorbital arch, and there was a moderate rise of bodily temperature. Incision in the line of the eyebrow yielded thick pus, which microscopically showed staphylococci. Necrotic bone could not be found. The condition improved under vaccine therapy. The infection was regarded as having arisen in an acute periostitis secondary to traumatism.
W. H. Crisp.

Joiris, Fanchamps, and Barrac. **A difficult diagnosis: exophthalmos with eyes fixed, and retrobulbar neuritis.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 20.

The subject of the report was a man of 67 years, in good health and without signs of hyperthyroidism, who was suddenly stricken with bilateral exophthalmos which lasted several months and was accompanied by impaired motility and retrobulbar neuritis. The writers concluded that the symptoms resulted from lesions of the central nervous system localized in the diencephalo-mesencephalic region or near the sella turcica. In the discussion Weekers regarded it as most probable that the lesion was orbital. Coppez believed the affection to be an acute tenonitis. (2 figures, references.)
J. B. Thomas.

Jung, J. **Formation of artificial stump by implantation of cartilage.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 215.

Jung ascribes the failures of healing after insertion of Löwenstein's cartilage to insufficient sterilization and to retaining sutures. After implantation of the cartilage the threads are removed. Tenon's capsule is closed by three or four catgut sutures, and the conjunctiva by the same number of silk sutures which are removed after about two weeks. From his experience Jung recommends implantation of cartilage.

C. Zimmermann.

Krause, A. C. **The spermine bases of ocular tissues.** Amer. Jour. Ophth., 1937, v. 20, May, pp. 508-510.

Marsh, E. J. **An early report of a case of cyclopia.** Arch. of Ophth., 1937, v. 17, Feb., p. 346.

The New Haven colonial records in 1641 contain a description of a case of cyclopia complicated by cataract. The author believes this is probably the first report of the condition.

J. Hewitt Judd.

Moretti, Egisto. **Glass-ball inclusion in the scleral cavity (Mules Operation.)** Ann. di Ottal., 1936. v. 64, Oct., p. 661. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 106.)

Van Canneyt and Vandemenlebroecke. **Concerning a case of bilateral anophthalmos.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 17.

This affection occurs in one percent of the cases of congenital blindness. In each of the cases reported by the authors they were able to gather the eye histories of four generations whose members presented ocular malformations. (4 figures.) J. B. Thomas.

Wilson, R. P. **Phthisis bulbi with cholesterin crystals in anterior chamber.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 50.

A 28-year-old male had suffered for three months from a painful inflamed right eye. The eye, which had been injured in childhood, was soft, blind, and tender, with marked conjunctival and ciliary hyperemia, cloudy cornea, muddy iris, and pupil filled with exudate. After enucleation, the eye was found to be completely disorganized and the exudate in the anterior chamber contained large numbers of cholesterin crystals. Lawrence G. Dunlap.

14

EYELIDS AND LACRIMAL APPARATUS

Bab, Warner. **The pathology of the eyelashes.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 81.

Anomalies of the cilia are more frequent than appears from the literature. By examinations with the slitlamp and corneal microscope changes are often discovered which escape detection by the unaided eye or with the loupe. Irritations of the cornea are mostly caused by inverted cilia, which differ from the normal lashes in length, thickness, and color. This is illustrated by eight clinical histories. One case primarily presented phthirii on the lashes, while the pubic hair was not involved.

C. Zimmermann.

Brecher, I. **A novel simplified marginoplastic operation for trichiasis.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 182.

Instead of autoplastic alloplastic material, namely the membrane of a hen's egg (membrana testacea), is implanted into an intermarginal incision which is made immediately behind the lashes. The wound is closed by five or six sutures placed previous to the implantation. The method was successful in sixteen cases. (Illustration.)

C. Zimmermann.

Chandler, P. A. **Dacryocystorhinostomy.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 240.

In this very complete paper a review of the literature on the subject is presented and one hundred dacryocystorhinostomy operations are reported in three series: (1) A series of 53 done according to Mosher's technique with 70 percent success. (2) A series of 25 done

by the method of Ohm and Dupuy-Dutemps-Bourguet, with 80 percent success. (3) A series of 22 with a new method of anastomosing the sac and the nasal mucous membrane, with 100 percent success. This latter method aims to utilize the best features of previous techniques and develops a method of uniting the sac and the nasal mucous membrane by means of a T-shaped incision in the sac and suturing.

David Harrington.

Gerke, J. **Artificial reproduction of the ductus lacrimalis.** Zeit. f. Augenh., 1937, v. 91, Jan., p. 50.

Encouraged by his success in treating salivary fistula by insertion of a cannula, Gerke applied a modified technique to restoration of a lacrimal duct which had been destroyed in an explosion. Under local anesthesia, he punctures the vault of the nose after incision of the mucosa and continues a blunt dissection toward the eye. Through a small incision on the inner surface of the lower lid a metal cannula is introduced. A fork at its conjunctival end provides the necessary fixation, and after six or eight weeks the artificial canal will have become epithelialized so that the cannula can be removed, usually without anesthesia. The procedure is not difficult.

F. Herbert Haessler.

Granström, K. O. **Bell's phenomenon after tarsorrhaphy.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1935-1936, pp. 14-16. In Hospitalstidende, 1936, Dec. 15.

In three of five cases of facial paralysis in which tarsorrhaphy had been done, a change in Bell's phenomenon was noted. When the patient attempted to close the eyes, the eyeball on the paralyzed eye would roll laterally instead of upward. The normal Bell's reaction had been present before the tarsorrhaphys had been done. The change was evidently a protective mechanism, for when the eyeball rolled laterally the cornea became entirely covered, and this would not have occurred if the eyeball had turned upward.

D. L. Tilderquist.

Jameson, P. C. **Subconjunctival section of the ductules of the lacrimal gland as a cure for epiphora.** Arch. of Ophth., 1937, v. 17, Feb., pp. 207-212; also Trans. Pacific Coast Oto-Ophth. Soc., 1936, 24th annual meeting.

This procedure is advocated for the obstinate cases because of simple technique, small amount of trauma, and lack of postoperative complications. Under local anesthesia, an opening is made on the conjunctival surface of the lid adjacent to and slightly below the outer canthus. Through this the Stevens scissors is inserted and the fornix separated from its basic structure for an area 5 or 6 mm. in breadth by 15 to 18 mm. in length. If the separation is complete every ductule will have been sectioned.

J. Hewitt Judd.

Kaleff, R. **A simplified modification of external dacryocystorhinostomy.** Zeit. f. Augenh., 1937, v. 91, Feb., p. 140.

The modifications of Toti's operation which have been suggested may be divided into four groups. The author describes their characteristics and points out advantages and disadvantages of the operations in each group. He then describes his own modification in detail.

He incises the skin 4 to 5 mm. nasal to the angular vessels, near the insertion of the palpebral ligament, lays bare the sac, and dissects it and the contiguous periosteum free from the bony fossa. The bone is then perforated according to the method of Rubbrecht and the opening enlarged. The exposed nasal mucosa is incised along the upper, lower, and anterior edges of the bony window so that a single flap with posterior attachment is made. The tear sac is then split longitudinally from pole to pole so as to form a very wide anterior flap which includes almost the entire nasal wall, and a posterior flap just wide enough to allow passage of the needle in suturing. The flap of nasal mucosa is turned back and sutured to the narrow flap of the sac with two 000-catgut sutures. The wide flap of the sac is sutured to the subcutaneous tissue at the temporal edge of the skin

incision. Finally the skin wound is closed. After healing, the entire newly formed canal is lined with the epithelium of the wall of the sac and nasal mucosa. F. Herbert Haessler.

Solignac, G. **Contribution to study of the etiology and pathology of chalazion.** Ann. d'Ocul., 1937, v. 174. Feb., pp. 108-120.

The pathology of chalazion was studied in fourteen specimens. The capillaries and arterioles in the region of the chalazion often show obliterative processes. Fibrocytes are numerous in lesions of long standing. Guinea-pig inoculations and detailed bacteriologic studies were carried out on some of these cysts without demonstrating any probable microbic etiology. Solignac concludes that Levaditi's term "steatophagic granuloma" seems justified.
John C. Long.

Somerset, E. J. **A modification of Bowman's lacrimal probe.** Brit. Jour. Ophth., 1937, v. 21, April, p. 207.

The author has designed a lacrimal probe with the number easily discernible at the top end, and with the lower end similar to that of the Bowman probe. The risk of contamination by hand as with the Bowman probe is thus eliminated. (One drawing.)
D. F. Harbridge.

Spratt, C. N. **The use of Callahan tubes in treatment of chronic dacryocystitis and lacrimal stenosis.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th annual session, p. 260. (See Amer. Jour. Ophth., 1936, v. 19, July, p. 601.)

Van Lint, A., and Hennebert, P. **Atrophy (coloboma) of the lower lids, the ears, and the lower jaw.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 51.

The affection was congenital but not hereditary. The patient gave no history of lues. The pathogenesis is obscure. The amniotic-band theory has been abandoned. The embryo, from the beginning of its development, bears within itself the causes of degeneration. (5 figures.) J. B. Thomas.

Weve, H., and Kentgens, S. K. **Technique and results of dacryocystorhinostomy.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 195.

The operation with suturing of the mucous membrane according to Dupuy-Dutemps is described in detail. It is superior to Toti's method, with complete success in 97 percent. In tuberculosis of the tear sac, indicated by swelling of the preauricular and submaxillary lymphatic glands, extirpation of the lacrimal sac is preferable, with after treatment by roentgen rays. (Illustration.) C. Zimmermann.

Wilson, R. P. **Gangrene of lids.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 65.

Three such cases were seen at Giza in one year. The fulminating swelling and edema of the lids followed by skin discoloration and sloughing with offensive odor and greatly enlarged preauricular and submaxillary glands were characteristic. Two months later, the slough had separated, and the affected area slowly healed by cicatrization, leaving slight ectropion and lagophthalmos. One case occurred in a male aged thirty years and another in a female of the same age. The third case is not described. Lawrence G. Dunlap.

15
TUMORS

Anthonisen, Harold. **Glioma of the chiasm with pigmentation of the skin.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1935-1936, pp. 16-21. In Hospitalstidende, 1936, Dec. 15.

A girl, seven years old, showed the following symptoms: (1) reduced vision, both eyes, (2) fat deposits localized on the abdomen and the hips, (3) disturbed mentality, (4) frequent urination, (5) pigmentation of skin resembling that of Recklinghausen's disease. Examination revealed bilateral optic atrophy. A roentgenogram showed a normal sella and there was no hemianopsia. Based on these findings,, a diagnosis of tumor of the chiasm seemed justified. Only with a glioma

would there be pigmentation of the skin. Roentgen films showing enlargement of both optic foramina confirmed the diagnosis, which was later verified at autopsy.

Treatment offers very little although glioma of the chiasm and of the pons are the only forms examples of which may be irradiated with safety. Surgery may be tried but has definite risks.

D. L. Tilderquist.

Arguad, R., and Couadau, A. **General consideration of psammoses in regard to a cystopsammoma of the papilla.** Arch. d'Opht., 1936, v. 53, Dec., p. 869.

Psammomata of the optic nerve are rare tumors, and especially rare are cysts of the papilla. The authors report a case of cystopsammoma of the optic disc occurring in a woman of fifty years whose left eye was enucleated following two annual attacks of acute glaucoma. The disc was elevated and occupied by a grayish-yellow cauliflower-shaped tumor. Microscopic examination revealed a large cyst surrounded by calcareous concretions, the majority of which were developed in interfascicular collagenous tissue, suggesting a secretory origin. (Illustration.)

Derrick Vail.

François, Jules. **A new case of congenital and benign melanosis of the eye.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 38.

The author reported three similar cases in 1934 (see Amer. Jour. Ophth., 1935, v. 18, p. 686). There are five figures in the text, including a genealogic family tree which indicates color of hair, iris, presence of nevi, and so on. No other case of ocular melanosis was found and only one member (a nephew) presented clear signs of hyperpigmentation. J. B. Thomas.

Frost, A. D. **Leiomyoma of the iris,** Amer. Jour. Ophth., 1937, v. 20, April, pp. 347-353; also Trans. Amer. Ophth. Soc., 1936, v. 34, p. 86.

Höeg, N. **Melanosarcoma in a conjunctival nevus.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1935-1936, pp. 3-5. In Hospitalstidende, 1936, Dec. 15.

A woman of 67 years had a rapidly growing tumor of the conjunctiva. The eye was enucleated and microscopic examination proved the tumor to be a pigmented sarcoma. The author had seen this patient eight years earlier, at which time a pigmented nevus was found at the site of the present tumor. The question is raised whether every pigmented nevus of the conjunctiva should be removed.

D. L. Tilderquist.

Juler, F. A., and Law, F. W. **A case of unilateral melanosis of the eyeball with development of sarcoma.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 121.

Including his own, the author found seven cases of development of sarcoma of the choroid out of 110 eyes reported as subject to diffuse melanosis. A detailed report of the clinical and pathological findings is given. (Illustrated.)

Beulah Cushman.

Lawson, Arnold. **A case of neoplasm of the temporal fossa associated with proptosis of the corresponding eye.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 206.

In a woman 54 years of age, a neoplasm of the temporal fossa appeared in 1924, associated with proptosis on the same side. The roentgenogram indicated definite thickening of the orbital walls. The tumor decreased in size after radium treatment and had remained shrunken since 1927, but the exophthalmos had remained the same with no loss of vision, and with normal visual fields. Beulah Cushman.

MacDonald, A. E. **Choroidal chorion-epithelioma secondary to teratoma of the testicle.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 117. (See Amer. Jour. Ophth., 1937, v. 20, Feb., p. 231.)

Metivier, V. M. **Lymphosarcoma of the eyelid.** Brit. Jour. Ophth., 1937, v. 21, April, pp. 202-206.

An eleven-year-old boy of impure African descent was observed in Octo-

ber of 1934. The boy failed to report for the operative treatment suggested until two months later, by which time the globe of the right eye was completely hidden. The eyeball was found free from involvement. Both eyelids were removed and the orbit exenterated. Consistently strong positive Wassermanns led to two courses of treatment with neo-arsenobenzol and bismuth. The boy was reported remaining well and in good health when last seen in December of 1936. (Histologic report, 5 photomicrographs, 2 references.)

D. F. Harbridge.

Motto, M. P. **Neurofibroma of the orbit.** Arch. of Ophth., 1937, v. 17, Feb., pp. 340-345.

A man aged 37 years presented in the lower, outer portion of the orbit a nonmovable tumor mass which had been present for about two years. Histologic examination showed palisading of the nuclei characteristic of a neurofibroma. Since these cells are chiefly derived from perineural elements, the growth should probably be classified as perineural fibroblastoma. The article is illustrated by photographs and a photomicrograph.

J. Hewitt Judd.

O'Brien, C. S., and Braley, A. E. **Common tumors of the eyelids.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th annual session, p. 85. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 110.)

Terrien, F., and Veil, P. **Anatomoclinical study of a case of nevoid cancer of the caruncle.** Bull. Soc. Franç. d'Opht., 1936, v. 49, p. 106. (See Amer. Jour. Ophth., 1937, v. 20, Feb., p. 232.)

Toulant and Morard. **Diagnostic histology and treatment of meibomian epitheliomas.** Bull. Soc. Franç. d'Opht., 1936, v. 49, pp. 27-37.

Meibomian epitheliomas of the lid seldom arise from the palpebral glands. The author reports two cases of glandular epithelioma of the lids in adults aged sixty years. The first, a large epithelioma of the left upper lid without any glandular involvement, was treated with deep x-ray therapy alone and recovery resulted without recurrence at the end of one year. Histologic examination revealed tumor cells of three types: first, elongated cells more or less fusiform and taking a basic stain; second, cells filled with protoplasm and fine granules; third, large clear cells with vacuolated protoplasm and deformed nuclei. The second patient received surgical treatment for a tumor the size of a hazelnut upon the conjunctival surface of the lid. At the end of eight months the condition was satisfactory.

Deep x-ray therapy caused rapid disappearance of a large tumor. Other methods, such as electrocoagulation, were followed by recurrence.

Clarence W. Rainey.

Velhagen, K., Jr. **Sarcoma of the lacrimal sac.** Klin. M. f. Augenh., 1937, Jan., v. 98, p. 38.

A woman of 76 years had noticed for forty years a swelling of the left lacrimal region. It suddenly grew larger with loss of vision of the left eye. The tumor was extirpated and found to be a spindle-cell sarcoma of the tear sac, which apparently had developed from a fibroma. No relapse occurred after three months. (Illustration.)

C. Zimmermann.

Voelkel, R. **The question of symmetric orbital tumors.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 169.

A man of 24 years showed symmetric orbital tumors, exophthalmos, and reactive osteoporosis and osteosclerosis of the right orbit. An excised piece consisted of granulation tissue, lymphocytes, eosinophilic leucocytes, some giant cells, and numerous foci of transition to hyalinization and sclerosis. On account of the growing right exophthalmos, Krönlein's operation was performed and a large tough tumor encircling the eyeball removed. The second patient, a woman of 42 years, suffered from leukemic lymphadenosis. The lids were bulging and tense. On eversion, each retrotarsal fold was found swollen and crowded away from

the eyeball by a glassy lardaceous mass. There were numerous nodules of lymphatic glands in other parts of the body. The patient died after two months from exhaustion. Shortly before death there was leucopenia with herpes zoster from lymphatic proliferations at the ganglion cells of the respective nerves of the neck and lower jaws. The autopsy revealed leukemic proliferations and swellings of the internal organs. C. Zimmermann.

Wheeler, J. M. **Plexiform neurofibromatosis (von Recklinghausen's disease) involving the choroid, ciliary body, and other structures.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 368-375; also Trans. Amer. Ophth. Soc., 1936, v. 34, p. 151.

Wilson, R. P. **Ganglioneuroma of eyelid.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 35.

A case report of a nine-year-old girl in which the eyelid was swollen from infancy. A firm fleshy tumor the size of a walnut was felt in the upper outer quadrant of the orbit. There was no pain or tenderness, merely deformity and ptosis. Microscopic sections revealed encapsulated medullated nerve fibers, ganglion cells, and islands of normal lacrimal-gland tissue, probably arising from sympathetic elements in the lacrimal gland.

Lawrence G. Dunlap.

Wilson, R. P. **Glioma of optic nerve.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 54.

A two-year old child was seen because of a "swelling pushing his left eye forward" for the past two months. The eye was shrunken as a result of a previous purulent ophthalmia. At operation, a large smooth elongated tumor was found filling the whole orbit and attached to the posterior pole of the eye. Sections showed the tumor to be an encapsulated glioma developed from the optic nerve.

Lawrence G. Dunlap.

Wilson, R. P. **Melanotic sarcoma of choroid.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 47.

A typical case occurred in a 54-year-old male who had noted progressive loss of vision for a year without pain or inflammation. The tumor extended from the equator to the ciliary body and microscopically pigment and tumor cells were seen spreading along the vascular channels which penetrated the sclera. Hence the stage of extraocular extension had clearly begun.

Lawrence G. Dunlap.

Wilson, R. P. **Xeroderma pigmentosum.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 37.

A rare case seen in a child of ten years, the condition having begun when she was five. There were numerous tumor-like processes in the skin (some large and ulcerated), increased pigmentation of the skin, scaling, and atrophy. The left eyelids were enormously swollen, the margins everted and ulcerated, and a large fungoid necrotic tumor protruded between the lids. No relatives had the disease and no cause could be found. Both eyes were blind from infantile smallpox.

Lawrence G. Dunlap.

16
INJURIES

Claessen, L. **A case of disciform hemorrhage of the cornea.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 11.

A boy of twelve years was struck in the eye with a bit of cardboard. Painful inflammation was followed by a hemorrhagic disciform infiltrate of the cornea, the brownish color of which persisted for more than three months. The pathogenesis of this condition is under dispute, Wernicke claiming that it is due to a tear of Descemet's membrane which permits blood to penetrate the layers of the cornea. Nectoux explains the infiltration by a lesion of the vascular plexus at Schlemm's canal.

J. B. Thomas.

Denti, A. V. **Fundus lesions after severe thoracic trauma.** Boll. d'Ocul., 1936, v. 15, Nov., pp. 1176-1192.

A man of 32 years, after severe contusion of the chest, noted bilateral

diminution of vision. Fundus examination showed papillary and peripapillary edema with dilated blood vessels in the right and disc atrophy and dilated blood vessels in the left eye. A man of seventeen years, after severe crushing of the chest, showed edema of both discs with dilated blood vessels, and some time later nasal pallor of the discs with vision of one-third. The writer mentions the different theories to explain the ocular lesions. He regards these as results of sudden increase of intracranial blood pressure. (Bibliography.)

M. Lombardo.

Duc, Camillo. **Ocular chalcosis.** Rassegna Ital. d'Ottal., 1936, v. 5, Jan.-Feb., p. 135.

The author's experiments were conducted in eighteen rabbits having fragments of copper in the anterior chamber or vitreous of one or both eyes. In three cases the foreign body was expelled spontaneously. In most of the other eyes biomicroscopic and histologic examinations were made after periods varying from 19 to 76 days. For control, the same examination was made in some cases in the eyeball which had not carried the copper. The writer confirms the views of other authors concerning the relatively good tolerance of the eyeball to intraocular fragments of copper, especially in the vitreous, and the facility with which they are expelled spontaneously. Only one globe developed lens opacity, and this was due to accidental damage to the anterior capsule.

In a few histologic sections from three eyeballs, after presence of the foreign body in the anterior chamber for about 75 days, a few granules of copper were found in the endothelium and Descemet's near the iridocorneal angle, or even beneath the epithelium of the sclerocorneal margin.

Eugene M. Blake.

Giqueaux, R. E. **A case of traumatic retinal angiopathy, or Purtscher's disease.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Dec., p. 681.

Because of its comparative rarity, there being only thirty cases with 38 eyes reported in the literature, the case is reported in detail and is illustrated with a fundus photograph. It occurred in a man of 51 years who was buried under a pile of sacks of flour, with resulting contusions of the right neck and compression of the thorax. When released he noted that his right eye was blind. Examination of his eye 27 hours afterward showed no evidence of external injury in the form of ecchymoses or hemorrhages. The fundus exhibited white patches, suggestive of balls of snow or cotton, arranged in an irregular ring around the nerve head, one-fourth to one-half disc diameter in size, and a smaller number of hemorrhagic spots, the former near the larger vessels and the latter near the smaller vessels. The white patches were more crowded in the macular area. They seemed to lie in the same plane as the vessels, being neither covered by them nor overlying them. They had largely disappeared by the twentieth day and vision had recovered from seeing large objects to 20/200. By the 52nd day there was only a trace of one patch and vision was 20/30. Three months later the condition was unchanged.

M. Davidson.

Hartmann, Karl. **Technique of extraction of deeply imbedded minute pieces of iron from the cornea.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 212.

After enlarging the wound canal a fine short conical probe is brought into contact with the splinter and connected with the pole of a giant magnet (Volkmann's).

C. Zimmermann.

Lillie, W. I. **Cosmetics detrimental to vision.** Sight-Saving Review, 1936, v. 6, Sept., p. 163.

Because the cosmetic industry is not subject to Federal regulations unless the labels bear medicinal claims, there is at present no legal way to protect the public against dangerous cosmetics. A case of malignant exophthalmos is reported in which a Naffziger operation had to be done following the use of a weight reducer containing thyroid extract and a case of cataracts following the use of dinitrophenol for weight re-

duction is described. A case of toxemia following the use of Lash-Lure, a synthetic anilin dye for the eyelashes, is reported, and the neuritis following the use of hair dyes which contain a heavy metal is described. A strong plea is made for support of the Copeland bill, which will afford federal control of manufacturing, labeling and advertizing of prepared foods, drugs, and cosmetics. Edna M. Reynolds.

Martin, Philippa. **Radium necrosis of the cornea.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 87.

Radium necrosis of the cornea first becomes manifest with a diminution of sensation, loss of polish, and development of a superficial ulcer. The ulcer may remain stationary for months, then some infiltration into the cornea associated with mild iritis and later perforation may be observed. Severe necrosis only occurs after repeated irradiation and in the presence of sepsis. Repair may not begin for months and is always slow. The lids should always be sutured together if intensive radiation is to be done. The normal reaction is intense conjunctival chemosis, which may not appear for several weeks. An iris reaction is indicated by failure of the pupil to reach the same size as before irradiation. If the cornea has not been covered by the lids before the treatment, a tarsorrhaphy should be done when the first symptoms of reaction arise. Treatment of malignancy in the region of the eye by the radium "bomb" is less destructive than interstitial radiation with radium needles. (6 case reports, 4 illustrations.) Beulah Cushman.

Martinez Barrios, R., and Just Tiscornia, B. **The traumatic orbital apex syndrome.** Arch. de Oft. de Buenos Aires, 1936, v. 11, Dec., p. 685.

Two cases of this syndrome, that is of involvement of the optic nerve and of the oculomotor and sensory nerves passing through the sphenoidal fissure, are reported. One, resulting from an automobile accident, had exophthalmos, papilledema, and total ophthalmoplegia. In five weeks the condition had almost entirely cleared up. The favorable evolution is attributed to absence of fracture about the optic foramen, the X ray showing only a hematoma in the orbit. The second case resulted from a revolver-shot wound entering at the occiput and emerging through the orbit. There were enophthalmos and intraocular hemorrhage, with retinitis proliferans as a sequel, and a neuroparalytic keratitis with corneal ulceration. X ray of the optic foramen was negative. M. Davidson.

Van Duyse, M. **Unilateral intermittent emphysema of orbit and lid.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 61.

The emphysema followed a blow on the cranial vertex by a heavy block of wood. There was a fracture of the vault of the skull complicated by a fissure at the base, involving the roof of the orbit and prolonged to the cribriform plate of the ethmoid. J. B. Thomas.

Wilson, R. P. **Subconjunctival dislocation of lens.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 69.

A female aged fifty years struck her right eye on the handle of a frying pan. The next day the anterior chamber was full of blood and there was marked pericorneal ecchymosis. At the upper inner margin of the limbus was a rounded congested swelling, due to the subconjunctivally dislocated lens. Three mm. from the upper limbus and concentric with it was a 6-mm. linear scleral rupture. On the second day the cornea showed striate keratitis. Under intramuscular milk injections and atropine locally, the eye became quiet and the hyphema was absorbed in two weeks. Incarcerated iris gave the appearance of an iridectomy. Vitreous hemorrhages precluded fundus study. The tension was normal. In six months the lens had practically become absorbed, corrected vision was 6/60, and the fundus apparently normal, but a few vitreous floaters were seen.
Lawrence G. Dunlap.

17
SYSTEMIC DISEASES AND PARASITES

Blackberg, S. N., and Knapp, A. A. **The influence of the vitamin-D-calci-**

um-phosphorus complex in the production of ocular pathology. 1. A histological study of the changes in the fibrous tunic. Amer. Jour. Ophth., 1937, v. 20, April, pp. 405-407.

Fridenberg, Percy. **Humoral biopathology and the eye: some inferences and implications.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 187.

This extremely interesting article does not lend itself to abstracting and must be read in its entirely. A relationship between disturbances in the endocrine glands and various ocular signs and symptoms is implied and reasons for this implication are set forth. The theory that eyestrain is secretogenic is advanced and the manner in which eyestrain may overload the vegetative nervous system is described. A systemic treatment of eyestrain reflexes is outlined. David Harrington.

Heath, Parker. **Visual sequelae from epidemic meningococcus meningitis.** Amer. Jour. Ophth., 1937, v. 20, April, pp. 401-405; also Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st annual meeting, p. 489.

Lewis, P. M. **Eye changes in epidemic cerebrospinal meningitis: A clinical and pathologic study of two hundred cases.** Trans. Amer. Ophth. Soc., 1936, v. 34, p. 284.

In 49 per cent of two hundred cases of epidemic cerebrospinal meningitis there was ocular involvement on routine examination. This varied from a rare lens involvement to the commoner metastatic endophthalmitis. Ocular examinations should be frequently made and in the case of advancing papillitis they are of help in determining the frequency with which lumbar puncture should be made. The literature is briefly reviewed and there is a large bibliography. David Harrington.

Lijo Pavia, J. and Diez, M. **A and C vitamins in ophthalmology.** Rev. Oto-Neuro-Oft., 1937, v. 12, Jan., p. 12.

The subject is briefly reviewed, with special references to conditions which are supposed to depend upon inadequate supply of various vitamins.
M. Davidson.

Nakamura, B., Uchida, Y., and Nakamura, O. **Unidirectional permeability of the elastic membranes of the eye.** Graefe's Arch., 1937, v. 136, p. 471.

Vitamin C can pass through the capsule of the lens of freshly enucleated human eyes, easily inward but with difficulty outward. This penetration is particularly striking in about the first two hours of the experiment. It gradually diminishes in from three to twelve hours, the lens capsule apparently losing this particular quality during the period mentioned. Regarding elastic membranes of the eye other than the lens capsule, observations have not yet been completed. H. D. Lamb.

Rossi, V. **Cases of ocular syndromes of hepatic origin.** Arch. di Ottal., 1936, v. 43, May-Nov., p. 175.

Pathologic disturbances of the liver with consequent ocular pathology and ocular manifestations are reviewed by the author. H. D. Scarney.

Van Duyse and Van Canneyt. **Syphilitic lesions obtained by injection of septic material into the retro-ocular cavity of the rabbit.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n. s., Jan., p. 35.

The authors obtained a high percentage of primary and metastatic lesions by retrobulbar injection of syphilitic virus. They also succeeded in infecting the nictating membrane (which other techniques failed to do). They conclude that of all ocular structures the cornea is the most susceptible. (Illustrations.)
Derrick Vail.

Walsh, F. B. **Ocular signs of thrombosis of the intracranial venous sinuses.** Arch. of Ophth., 1937, v. 17, Jan., pp. 46-65.

The anatomic and pathologic features of the cavernous, lateral and superior longitudinal sinuses are reviewed, together with the salient clinical findings in septic thrombophlebitis

of these sinuses. Six cases are reported in detail and the autopsy findings are summarized. In five of six cases the hypophysis was affected. The author believes that thrombosis of the cavernous sinuses with recovery is relatively frequent, as quite often it has been found unexpectedly at autopsy. He presents the case of a boy aged eleven years who recovered from thrombosis of the lateral sinus but in whom Fröhlich's syndrome and extreme loss of vision resulted. Recent investigations indicate that inadequate cross circulation or a small opposite lateral sinus is the basis for occurrence of bilateral papilledema in thrombosis of the lateral sinus and so-called serous meningitis. (Discussion.) J. Hewitt Judd.

Weekers and Barac. **Ocular manifestations of Quincke's edema.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 29.

Localization of Quincke's edema in face and eyelids is observed relatively often, but involvement of the eyeball itself is very rare. The authors report such a case. As a result of their study they pose the question whether there may not exist isolated cases of allergic paroxysmal edema of the eyeball the nature of which is identical with that of Quincke's edema. In such an event this edema of the eyeball would be confused sometimes with hypertensive iridocyclitis, sometimes with glaucoma accompanying intraocular exudation. Reference is made to a case report by Barkan (see Amer. Jour. Ophth., 1919, v. 2, p. 800), which it is stated is the only case found in the literature in which ocular hypertension is linked with Quincke's edema.

J. B. Thomas.

Wegner, W. **Remarks on the etiology of chronic intraocular inflammations.** Klin. M. f. Augenh., 1937, v. 90, Jan., p. 15.

Among six hundred patients with suspected ocular tuberculosis observed during the last few years, Wegner found in many cases a parallelism not only with affections of the lungs but also with other forms of tuberculosis such as of the bones, skin, and glands. The histories frequently revealed tuberculosis in the family. While intercurrent febrile diseases may have a beneficial effect on common inflammations, they are not only valueless but detrimental in the various stages of tuberculosis. During two epidemics of very infectious tonsillar angina which attacked 70 out of 120 eye patients, the only cases in which the clinical aspect was changed for the worse were six out of seven cases of suspected tuberculous iridocyclitis and some corneal affections. These observations, Wegner believes, speak for the tuberculous charater of numerous eye affections.

C. Zimmermann.

Wilson, R. P. **Filaria of orbit.** Giza Mem. Ophth. Lab., 10th annual report, 1935, p. 56.

A sixty-year-old man noted a swelling of the left upper eyelid which varied in amount and at times almost closed the eye. Palpation of the ptosed upper lid revealed a smooth tumor, the size of a bean, attached to the upper border of the orbit and the tarso-orbital fascia. Sections showed a chronic granuloma with enormous numbers of eosinophile cells. Near the center of the tumor were coils of a nematode in an endothelium-lined space. No other micro-filariae were found in the patient.

Lawrence G. Dunlap.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Bagchi, S. **Blindness in India.** Calcutta Med. Jour., 1936, v. 30, Feb., p. 460.

The author presents statistics covering 3,404 cases of blindness in India. Of these 3.2 percent were due to congenital conditions. Cataract caused blindness in 1,350 cases.

Theodore M. Shapira.

Bass, Karl. **The history of ophthalmology in Germany during medieval times.** 2. Graefe's Arch., 1937, v. 136, p. 457.

From the fourth to the thirteenth century, practically the only mentions

of improvements of vision are those of miraculous cures credited to members of the priesthood. Before 1351 in Munich, there is mention of an eye physician of the female sex. In the same year it is recorded that Meister Johann of Mainz successfully operated upon both eyes by couching for cataract in a 79-year-old abbot of Tournay in Belgium. At Frankfort on M., a Jewish woman eye physician named Serlin was famous between 1423 and 1457. Around 1500, it is learned from a document telling of the burning of Jews at Berlin that out of 38 one individual, an eye physician, escaped. In all, there is mention of forty eye physicians in medieval times in Germany. The specialist of that day, in addition to injuries of the eyelids and anterior part of the eyeball, was familiar with paralysis of the upper eyelid, entropion or ectropion, lice on the eyelashes, trichiasis, trachoma, hordeolum, chalazion, cancer of the eyelid, dacryocystitis with fistula, conjunctival inflammations, corneal inflammations and opacities, pterygium, and cataract. The treatment of these ocular disorders by the learned physician must never include surgical measures. The latter formed the field of activity of the uneducated wound and eye physicians. Caspar Stromayr of Lindau is the first German eye physician known to have undertaken the examination and obtained the certificate of the medical faculty of a university, in this case that of Vienna. H. D. Lamb.

Busacca, Archimede. **Impressions and statistics on trachoma in the state of São Paulo.** Rev. Internat. du Trachome, 1936, v. 13, Oct., p. 161. (See Amer. Jour. Ophth., 1937, v. 20, May, p. 559.)

Chance, Burton. **Hughlings Jackson, the neurologic ophthalmologist.** Arch. of Ophth., 1937, v. 17, Feb., pp. 241-289.

Many interesting facts regarding the influence of the ophthalmoscope in Jackson's observations and investigations are related, and a summary of his most important contributions is given. (Complete bibliography.)

J. Hewitt Judd.

Cowan, A., and Sinclair, S. M. **Causes of blindness in Pennsylvania from the medical and social aspects.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th annual session, p. 74. (See Amer. Jour. Ophth., 1937, v. 20, Jan., p. 114.)

Cunningham, E. R. **Blindness in West China.** Chinese Med. Jour., 1936, v. 50, Oct., p. 1507.

The author lists the causes of blindness found in 749 blind eyes of 506 patients seen in Chengtu, Szechewan. Most cases were due to corneal ulceration complicating acute ophthalmia, but trachoma was also an important factor. Lawrence G. Dunlap.

Demaria, E. B. **Trachoma in Argentina.** Oftalmologia (Buenos Aires), 1936, v. 1, pp. 7-52.

The latent or beginning trachoma of infancy, its prophylaxis, and its treatment in the schools are especially considered. The author, following Morax, thinks trachoma is a family disease which starts in infancy and frequently heals spontaneously or with slight treatment, leaving only small scars in the tarsus.

He describes the findings in the poor suburb of Santiago del Estero, where of 517 inhabitants living promiscuously fifty percent were trachomatous, a great majority of them children. A campaign was started in Argentina some years ago based on the periodical examination of school children in the infected areas by the Department of Health, and the treatment of those found affected. The treatment was done by school teachers, or by nurses, or in special dispensaries. With these prophylactic measures trachoma has been reduced in the schools of Argentina from seventeen percent in 1928 to eight or ten percent in 1935.

In the general population trachoma was formerly found in a proportion of ten to twenty percent. This rate has been diminishing year by year under examination and exclusion of trachomatous immigrants and the conjoint work of the Red Cross and the Argentina League Against Trachoma.

M. Uribe Troncoso.

Esser, A. A. M. **Eye and oracle.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 223.

The article shows how antiquity consulted and utilized the oracle in cases of sickness. C. Zimmermann.

Esser, A. A. M. **Pathology and therapy of the lids by Vāgbhata.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 216.

The first two chapters of Vāgbhata's "Ophthalmology," by a disputed person in old Indian medicine, are presented in translation. Essential relations exist between Suśruta and Vāgbhata, showing almost identical similarities of whole rows of verses, which reduce the multiplicity of old Indian medical works to an original, followed by more or less dependence or direct plagiarism of the works of all later authors.

C. Zimmermann.

Gordon, B. L. **Oculus fascinus (fascination, evil eye).** Arch. of Ophth., 1937, v. 17, Feb., pp. 290-319.

The superstition regarding the evil eye has its origin in the earliest historical documents. Its influence on the various races and on the development of medicine is outlined. Many sayings used today find their origin in the belief that they would protect against the powers of the evil eye.

J. Hewitt Judd.

Greeff, R. **The development of ophthalmology in the Charité Hospital at Berlin.** Klin. M. F. Augenh., 1937, v. 98, March, p. 353.

This is a historical sketch of the department of ophthalmology, part 1 from 1726 to the founding of the University in 1810, and part 2 since the founding of the University. The eye department became independent in 1868 under the direction of Albrecht Graefe.

C. Zimmermann.

Green, John. **The promotion of blindness.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th session, p. 17.

The factors in the promotion of blindness cited by the author are, (1) failure to use prophylaxis or to secure competent ophthalmic care in ophthalmia neonatorum, (2) neglect of strabismus in the early years, (3) economic conditions favoring the spread of trachoma, (4) delay in the treatment of brain tumors, (5) failure to recognize tuberculosis in the etiology of corneal and uveal diseases, (6) poor training of ophthalmologists, and (7) the growth of optometry. George H. Stine.

Lee, Tao. **A short history of old Chinese ophthalmology.** Chinese Med. Jour., 1936, v. 50, Oct., p. 1513.

After a brief historical review of Chinese ophthalmology, the author suggests that a great part of Chinese ophthalmology is based on the medicine of India. Early knowledge of anatomy of the eye was very scanty. Many eye diseases were mentioned in ancient Chinese literature, but the forms of treatment for them were more or less useless. Lawrence G. Dunlap.

McCrea, W. B. E. **The development of modern methods of estimating refraction.** Brit. Jour. Ophth., 1937, v. 21, March, pp. 118-132.

The author traces the methods of estimating refraction from the making of the first pair of lenses in China in the twelfth century to the time of modern refraction as developed by J. Soelberg Wells around 1870. He points out that the forerunners of modern ophthalmology laid true foundations for the refractionist. (Bibliography.)

D. F. Harbridge.

Nixon, J. A. **Bristol Eye Hospital.** Bristol Med.-Chir. Jour., 1936, v. 53, spring, p. 35.

The history of the Bristol Eye hospital, founded in 1810, is reviewed by the editor of the journal.

Theodore M. Shapira.

Stewens, Hermann. **The pain problem with consideration of experiences in some eye diseases.** Klin. M. f. Augenh., 1937, v. 98, Feb., p. 234.

In this philosophic article the author attempts to show that the separation between organic and psychic advanced

by rational psychology does not exist and is only a construction of human reasoning, etc. C. Zimmermann.

Strebel, J. **Art and eye.** Klin. M. f. Augenh., 1937, v. 98, Jan., p. 84.

The word "Dürer look" was coined by Hugo Kehrer, the art critic of Munich to whose latest monograph, "Dürer's self-portraits and Dürer portraits," Strebel adds some supplementary remarks, with reproductions of some of Dürer's portraits. He also gives illustrations of round spectacles of 1532 and of what is perhaps one of the first representations of enucleation, from a woodcut by Georg Pewez, which illustrated a poem by Hans Sachs.

C. Zimmermann.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Hagedoorn, A. **Congenital anomalies of the anterior segment of the eye.** Arch. of Ophth., 1937, v. 17, Feb., pp. 223-227.

The anomalies resulting from persistence of the loose postendothelial tissue which develops when the anterior vitreous body loses its connection with the lens by atrophy of the cones of the lens epithelia are peripheral anterior synechiae, usually combined with other anomalies, such as corectopia, slit-like pupil, hypoplasia iridis and embryotoxon posterius. Two examples of these anomalies are illustrated by stereoscopic photographs.

J. Hewitt Judd.

Löhlein, Walther. **Hereditary malformations as cause of diminished resistance from the standpoint of the eye physician.** Graefe's Arch., 1937, v. 136, p. 434.

The clinical findings in three cases are briefly reported. In a boy eight years old, the left eye showed congenital microphthalmos and the right eye, although having a myopia of 12 D. and extensive remains of the pupillary membrane, possessed sufficient vision to enable him to get along well in school. The right eye later lost its good vision from severe chorioretinitis with vitreous exudates, hemorrhages in the retina, and partial detachment of the retina. A young woman had had from birth very little vision in the right eye because of a myopia of 20 D. accompanied by the usual stretching at the posterior pole. The left eye had always had normal vision, although the optic papilla presented an inverse conus and the pupil an oblique elongated oval shape. In the left eye the vision diminished to 5/50 from a paracentral retinal edema, atrophy of the pigment epithelium, and paramacular chorioretinitis. Under treatment, vision improved to 5/7.5. In a young woman, nineteen years old, the right eye presented a congenital hole in the papilla but had had good vision. The left eye was entirely normal. Later the vision in the right eye diminished to 4/12. A central scotoma for colors with a radius of about 5° was noted. Although no objective findings could be observed, the author thought there must have been a rarefaction or damage of the retina in the macular region. In none of the three cases cited was there syphilis, any focus of infection or any history of trauma. H. D. Lamb.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month

Deaths

Dr. Dwight H. Trowbridge died at Pasadena, California, May 4, 1937, of bronchopneumonia, aged 66 years. He had lived in Fresno, California where he practiced ophthalmology and otolaryngology for forty years.

Dr. Arthur Frederick Jackle, New York, died March 6, 1937, aged 55 years, of pneumonia.

Miscellaneous

The Leslie Dana Gold Medal, awarded annually for outstanding achievements in the prevention of blindness and the conservation of vision, was presented this year to Mrs. Winifred Hathaway, of New York City, Associate Director of the National Society for the Prevention of Blindness. Mrs. Hathaway was selected for this honor by the St. Louis Society for the Blind, through which the medal is offered by Mr. Leslie Dana of St. Louis. The award was made at a luncheon meeting of the Association for Research in Ophthalmology, in Atlantic City, on Tuesday, June 8th, during the convention of the American Medical Association. The presentation address was made by Dr. Park Lewis, of Buffalo, N.Y., who was awarded the Leslie Dana Medal in 1928.

Mrs. Hathaway is the second woman to be accorded this honor. In 1926 it was conferred upon the late Miss Louise Lee Schuyler, of New York City, who was chiefly responsible, with Dr. Park Lewis, for the founding in 1908 of the National Society for the Prevention of Blindness. Last year, the medal was presented to Dr. John M. Wheeler, Professor of Ophthalmology in the Medical School of Columbia University and Director of the Eye Institute at the Columbia-Presbyterian Medical Center in New York.

The inscription on the medal this year reads: "To Winifred Hathaway whose inspired service in behalf of sight-saving classes for visually handicapped children has made her another LADY WITH A LAMP."

Mrs. Hathaway has achieved an international reputation through her many years of service in the campaign to save eyesight, especially for her work in promoting the establishment of sight-saving classes in which children with seriously defective vision receive a normal education with a minimum of eyestrain. Largely through her personal inspiration and encouragement, there are now 525 such classes in 165 communities throughout the United States.

On the occasion of the International Congress of Ophthalmology to be held at Cairo from the 8th to the 15th of December, 1937, several trips in the Orient have been organized, leaving Marseilles on December 3, 1937.

The first trip comprises first-class passage from Marseilles to Alexandria by the de luxe steamer "Mariette Pacha" (15,000 tons) belonging to the Messageries Maritimes lines, lunch and dinner on December 7th—the date of arrival at Alexandria—first-class railway journey from Alexandria to Cairo and return, conveyances from the railway stations to hotels and vice versa, the stay at a first-class hotel during the sitting of the Congress (bed and breakfast only) all meals on December 16th and 17th, arrival at Marseilles on December 21st. The program giving full particulars of this and several other trips will be sent free of charge on request addressed to Cie Generale Transatlantique (French Line), 610 Fifth Avenue, New York.

During July from the sixth to the thirty-first inclusive, the Department of Ophthalmology of the Harvard University plans to repeat the course in physiological optics which was given last year. This course is designed essentially for teachers of physiological optics, and it comprises all-day instruction, including lectures and laboratory work. The course is given by Drs. Ludvigh, Cogan, and Easton, under the general direction of Drs. Verhoeff and Lancaster. The tuition for the course will be $150.00.

The annual meeting and dinner of the Wills Hospital Society was held during the Convention of the American Medical Association at the Seaview Golf Club. Forty members attended including the seven hospital residents who were present as guests. Dr. E. C. Ellett was elected president for the ensuing year. Dr. Arthur J. Bedell the retiring president presided.